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THE

PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

VOLUME VIII.

EDITED BY G. WHARTON SIMPSON.

Nulla recordanti lux est ingrata.—MARTIAL.

LONDON:
PRINTED AND PUBLISHED BY THOMAS PIPER, 32, PATERNOSTER ROW.

1864.

LONDON
THOMAS PIPER, PRINTER, 32, PATERNOSTER ROW.



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PREFACE.

The prefatory words which are appended to a volume like this, are necessarily written after it is completed, and partake rather of the nature of a retrospect, than of an introduction. They moreover afford a pleasant opportunity for the Editor to speak personally, as it were, to his many friends—contributors, correspondents, and readers—thousands of whom he may never see, but whom nevertheless he knows well, and esteems much. It is one of the privileges attaching to an office of much responsibility, many anxieties, and constant watchfulness, to know that the results of these cares reach a circle, which however extended, and extending, is at once indulgent and appreciative. If in a serial devoted to general literature, the Editorial duties are less onerous, because the subjects to be treated are only limited by the bounds of human interest, the privileges are also less special, as the personal relation to readers is less defined, and wanting in the sympathetic bond which unites those with a common aim and interest, like that which unites writers and readers, sowers and reapers, in the field of Photography.

The year's chronicle of progress now before us, is perhaps one of the most interesting we have had the pleasure of issuing. Within no twelve months that we remember, has so much been transpiring, which has enchained the interest of Photographers. The subject of permanent printing has so long been a matter of vital interest, that any promise of a satisfactory solution of the question, is sure to arouse eager attention. The announcement early in the year of a perfect Carbon Process, guaranteed by the exhibition of some of the most charming specimens of the Art; and the later announcement of a perfect Uranium Process, supported also by examples of unusual beauty; and some other announcements of scarcely less interest, have tended to keep Photographers on the tiptoe of expectation. Our readers know to what extent, at present realization has fulfilled or fallen short of anticipation. Something — perhaps much — has been gained; but the practicable permanent printing process is still to be discovered or perfected. This is not, however, the place to discuss the subject in detail. Our object is rather here to avail ourselves of the personal privilege to which we have alluded, in order to refer to the position of the journalist in relation to announcements of the important promise put forth by some of the processes of the year. His position is a very responsible one. His first duty is to avoid misleading: he must pre-eminently avoid raising hopes which cannot be, or may not be, realized; but he must not less scrupulously avoid an antagonistic or repressive influence on nascent discovery. By raising false hopes he may cause much disappointment; but by suspicious distrust or a disposition to "put down" novelties, he may retard progress. He must in any case chronicle: for the photographers of to-day are like the Athenians of old—as indeed the votaries of an art of such rapid growth and startling innovation could scarcely fail to be—ever anxious to hear or tell some new thing. Enquiry, examinations, experiments, tests, must all be assiduously and carefully made. Fact and opinion

must be recorded from week to week, whether harmonious or contradictory. The claims of inventors, discoverers, and modifiers have to be stated, and often to be reduced from the colossal proportions in which they are put forth ; whilst on the other hand, the sweeping disallowances of detractors—very few we are happy to believe in Photography—who see neither novelty, beauty, nor truth in the processes or results with which they are not themselves in some way associated, have to be combated or neutralized. Thus the thousand tangled and disconnected threads of rumour and statement, announcement and denial, claim and counter-claim, fact and fancy, which form the story of our photographic lives from day to day, have to be unravelled, joined, and woven into as goodly a tapestry of intelligence and information as the heterogeneous materials and our poor ability may permit.

We have referred to this subject in these after-words, because, as we have intimated, this volume contains an unusual share of real and assumed novelties, and the discussions thereon ; and because we have had unusually gratifying evidence of the appreciative and sympathetic character of our readers, in the abundant and satisfactory correspondence we have received in connection with the subjects discussed. We have little need, therefore, to refer to our own labours during the year, or to say that it has been our simple aim, whilst giving the earliest intelligence of all novelties, and offering a fair field, without fear or favour, to the claims of all, to hold at the same time an even balance, avoiding, on the one hand, an over-sanguine enthusiasm, and on the other, with still more aversion, a repressive sneering scepticism.

For the rest, the following pages contain a complete compendium of the Photographic News of the world during a year—the record of a year's experience, and a year's progress of an art unparalleled in its rapid growth in interest, usefulness, and perfectness. The special claims of topics of current interest have displaced some papers of an educational and general character, which were promised at the commencement of the volume. These are, however, merely kept in abeyance, until an opportunity shall occur of issuing them in our next volume.

The Preface to one volume is not a suitable place for entering into pledges or making explanations as to the aims of the next. We shall simply say here, therefore, that having received such unequivocal evidences in an extensively increasing circulation and constantly accumulating and satisfactory correspondence, of the successful character of our past labours, we shall endeavour to continue in well-doing, walking by the same rule, and minding the same things. We may also add that we have in course of arrangement for the next volume new features of interest, which we feel assured cannot fail to find favour with our readers and friends, and maintain the prestige of the Photographic News as an organ of Photographers. With thanks, kind wishes, and all seasonable greetings to contributors, correspondents, and readers, we conclude.

December 29th, 1864.



PHOTELECTRIC ENGRAVING _ DALLAS' PROCESS

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THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 278. *January* 1, 1864.

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OUR PHOTO-ELECTRIC ENGRAVING.

With each copy of the present number we present our readers with a view of *Kenilworth Banqueting Hall*, the combined work of photography, the electrotype process, and the printing-press. The negative was taken from nature, by Mr. Francis Bedford, the engraving was effected by Mr. Duncan C. Dallas, by what he terms his photo-electric, or photelectric process. The plate is altogether untouched by the graver, so that the result reaching the hands of our readers is due solely to science; nature is her own limner throughout, and presents her own work without the finishing touches of man. We believe the specimen we now issue to be the very best result of the kind ever produced: we have seen no untouched photo-engraving which can in any degree compare to it, either in pictorial effect or in the probability of economic value.

Of the immense importance and varied use of a simple and efficient system of multiplying the drawings of the sunbeam, by means of the printing-press, it is unnecessary to say many words. To be able thus to multiply the absolute transcripts of nature rendered by photography; to be able to reproduce on the engraved plate every touch of the painter, without the intervention of the engraver; to perpetuate the fac-simile of the draughtsman's design, or the penman's writing, with the truth of photography, and the rapidity of the printing-press, was always an object pre-eminently worth searching for. To obtain such a method has been the darling ambition of many of the ablest experimentalists in photography, from the earliest days of its history, and we find many of the most honoured names associated with important contributions to the accomplishment of such an idea. Almost every mode of producing a printing surface has been tried: etching in various ways, photogalvanography, photoglyphy, photolithography, photozincography, photo-block-printing. By each method something has been done, and in reproductions of subjects where the delineation consisted of lines and points, gradation being secured by the conventional rendering of hatching and stippling, a considerable amount of success has been secured. But where the subtle gradations given by nature in a photograph, or the flat tints and soft blendings of tone of the painter are to be reproduced, most processes have hitherto failed. The reason for this is very simple. Gradation of monochrome, when produced without lines or points by the painter, is generally produced by the differences in quantity applied of a semi-transparent pigment; in the deeper tones, sufficient of the pigment is applied to cover up the light ground underneath; in the half shadows and lighter tints, thicker or thinner washes are applied, having greater or less transparency, and so producing gradation and half-tone. In the photograph, gradation of tint is obtained somewhat similarly, by the gradation of metallic deposit more or less covering the white ground of the paper. It has been found impossible to produce a printing surface, to be worked at the printing-press, which should imitate this process, and obtain gradation by the varied thickness of the ink deposited. To surmount the difficulty thus presented, it has been found desirable to imitate, by some means, the conventional method of obtaining gradation, to produce, in short, a grain somewhat after the fashion of aqua-tint grain on a metal plate, or the lithographic grain on a stone.

Amongst by far the most perfect specimens of half-tone produced by any of these methods were the photoglyphs of Mr. Fox Talbot, which were first presented to the world in the pages of the Photographic News. These possessed wonderful minuteness and delicacy of gradation; but they lacked force and tone. The scale of tints was limited, and there was, despite their minute perfection and delicate beauty, a certain tameness and patchy effect. They were an immense improvement on anything which had been effected in the same direction *without re-touching*; but they were not sufficiently perfect for commercial purposes, to take the place of engravings done by hand. Some slight improvement has been made since, and a print published in a recent volume of the Edinburgh *Astronomical Observations*, an enlargement from a negative by Professor Piazzi Smyth, possessed many good qualities. A small photoglyphic print of Java scenery, which has recently been very highly spoken of, does not strike us, on examination, as superior to those which appeared in our pages four or five years ago. Some very good results have been produced by Mr. Paul Pretsch, but the majority of these have been retouched. The same remark applies to many fine specimens produced in France; and although touching is perfectly legitimate, if the object be to produce a work of art, much of the scientific interest of the production is destroyed.

The photo-electric engraving, by Mr. Dallas, which we now issue, is strictly untouched, and presents to our readers the process in all its strength and all its weakness. An exceedingly fine grain, resembling that of aqua-tint, is obtained, and aids in rendering gradation and half-tone very perfectly. As the print stands, it presents many of the characteristics of a fine work of art, whilst it retains all the characteristic truth of the photograph. The combination of force and delicacy is marvellous, in the ivy especially. The rendering of the texture in the old stone walls is very fine, and the long shadows on the foreground are wonderfully transparent. The absence of a sky or cloud is a photographic defect which would readily yield to the touch of the engraver, if necessary. The chief weakness of the process will be found in places where there is a broad mass of deep shadow, or black, such, for instance, as the shadowed arch in the right hand lower corner. The simple working of the process has not here given holding-ground, as it were, sufficient to retain the ink, which wipes out in cleaning the plate prior to taking each impression. Those who know

anything of copper-plate printing will readily understand what we mean. By very slight touching with the graver, or even by second application of this process itself to the part, this can be overcome, and the plate be made to hold the ink sufficiently to give the deepest tones. Our object was, however, to present the result of the process in its simplicity, without any kind of "dodging" whatever. As may readily be conceived, had our object been to make the most perfect artistic result, this would easily have been effected by placing the plate for a few hours in the hands of the engraver. But then it would have been impossible to determine how much was due to the process, and how much to the skill of the engraver.

The cost of producing a plate by this method, is, we understand, about one-third of that of engraving by hand. We have seen some very good results in portraiture, and prints very perfect, indeed, of reproductions from drawings. The engraving, once produced, may be made to yield any number of impressions by the process of *acierage*, or steel facing, or the plates may be reproduced and multiplied by the electrotype process. Blocks in relief for surface, or letter-press printing, can also be produced.

Regarding the details of the process itself, our information is not so full as we could wish. Suspicious of the insufficient protection afforded by the patent laws, Mr. Dallas prefers to preserve his secret, so that he may obtain, by the sole use of his process, remuneration for the money and time he has expended in its development. For the sake of the art we regret this decision, as the process is thus deprived of the improving aid of many minds, but we cannot but acknowledge its legitimacy and fairness. The labourer is worthy of his hire. We quote briefly from his own words as much relating to the details of the operating as he at present cares to be made public.

"It was after experimenting some time with photogalvanography that it occurred to me to strike out in a different direction. Any one acquainted with engraving is aware that aqua-tint and 'chalk,' or stippling, produce fine grain, half-tones, and detail. The problem I set myself was how to imitate this combination. The aqua-tinter employs common resin dissolved in spirits of wine. This poured over his plate evaporates, and leaves numerous globules of resin attached to the surface. The size of these globules depends on the proportion of resin to spirit. When the acid is put on the plate the resin acts as a resist, and a tint is produced in the intermediate parts. If the plate were now electrotyped before the removal of the resin, and a print taken from the electrotype, the resin parts would give a kind of stipple or 'chalk' marks, interspersed with tint. It is something similar to this which I have succeeded in imitating, with peculiarities *sui generis*, by photography and the electrotype. I can also, as it were, modify the size of the dots, obtaining them so fine as to carry almost microscopic detail; but if too fine, there will be deficient depth in the dark. In this, as in all things, there is the happy medium, and this I believe I have secured. I commence with the negative. This should be reversed. From the negative a positive proof is taken; this I prefer not toned, but merely fixed in the sepia colour by the 'hypo.' I cover the negative, which must be varnished with a material from which I obtain a latent positive. This latent positive I turn by a simple process into a suitable negative, and it is with this negative that I subsequently manipulate."

Regarding the picture itself, we may simply remark that the subject chosen, and the treatment, are worthy of Bedford, the figures admirably aiding in giving life to the picture and relative size to the objects. For those who wish to bind it with the PHOTOGRAPHIC NEWS, it is now the right size. For those who wish to preserve it in a portfolio, we should recommend that it be cut to retain an inch all round of the present margin, and then mounted on a white board, a plan which will materially enhance the effect of the picture.

OUR NEW VOLUME.

AT the opening of a new volume, and commencement of a new year, we have to thank contributors, correspondents, and readers, for a very large share of aid, support, and success during the past year. For the future, we have simply to promise that we will endeavour to merit the success we have achieved. Amongst various arrangements for the coming year, now maturing, we may mention a course of articles by Mr. V. Blanchard, on composition and chiaroscuro, especially in their relation to photography, to be illustrated with engravings. In a former volume a series of articles on this subject appeared from the able pen of Mr. Lake Price. These articles were general in their character, chiefly explaining fundamental principles. The present series is intended to have a specific bearing on photographs and the necessities of photography, with illustrations of bad and good results possible in the same circumstances. We may further add that regular or occasional articles will appear from the pens of Mr. William Crookes, F.R.S.; Mr. J. Spiller, F.C.S.; Dr. Hill Norris; Mr. Jabez Hughes; Mr. H. P. Robinson; Mr. T. R. Williams; Mr. Valentine Blanchard; Dr. Van Monckhoven; Dr. Maugham; Mr. Charles Martel; Mr. Samuel Fry; the Rev. Wm. Law; Mr. J. W. Osborne; Lieut. Noverre; Mr. Charles Waldack; Mr. F. F. Thompson; Mr. F. W. Hart; "A Photographer's Assistant;" and other accomplished photographers, skilful chemists, and able writers.

PHOTOGRAPHY IN THE PAST YEAR.

THE past year has been in many respects a successful one for photography. Commercially, its applications have been extending, and its professors have been generally prosperous. The art itself has been progressing and expanding. Well understood processes have been acquiring greater stability and excellence. Some new principles in the other processes have received recognition, and specific improvement has been made. General activity, increased scope and usefulness, and steady improvement, are amongst the facts to be recorded in the year's chronicle of the art.

Perhaps dry-plate photography presents some of the most noteworthy modifications. The value of certain alkaline conditions, which, at the commencement of the year was beginning to obtain hesitating recognition, is now an accepted fact of great importance. The idea seems to have been of such uncertain and gradual growth, that it is difficult to trace it to its origin. Although Mr. Bartholomew's alkaline gelatine process appears to contain one of the earliest distinct indications of the value of alkaline conditions, nothing further of a very definite kind seemed to proceed from it. The starting point of fresh experiment appears to have been the American practice of fuming the tannin plates before exposure. From this, Mr. Leahy and Major Russell, each independently, arrived at alkaline development. The latter gentleman had added to the claims he has upon photographers, by the assiduity with which he has worked during the year, to secure certainty in the application of this and other principles to dry-plate photography. The use of a simply bromized collodion, proposed ten years ago for the wet process, and but little used, is now likely to come largely into use in the wet process. In the year 1853, we find Sir J. F. W. Herschell remarking, when speaking of the hard black and white effects of iodized collodion, that "iodine must be thrown overboard, or limited in its use, *coûte qui coûte*, if photography shall ever satisfy the desires of the artists," and he then adds, "A new photography has to be created, of which bromine is the basis." It is possible, in dry photography at least, that this remark may still become true. It is a somewhat singular fact as bromine played such an important part in the first most successful and beautiful dry process—that on silver plates—that its value in other dry plates should have been so tardily discovered or acknowledged. We have not heard much of hot development for

tannin recently; but some of the charming instantaneous pictures sent by Col. Stuart Wortley, at the last year's Photographic Exhibition, were produced on tannin plates, and with the aid, we understand, of hot development. The addition of various substances to the tannin solution, to increase the sensitiveness of the plate, has been largely discussed; but the utility of such additions still remains an open question. The idea enunciated by Mr. Bartholomew, and further worked out by Mr. Hannaford, of adding silver to the albumen solution in Fothergill plates, has been revived by Mr. Fothergill, and the results are highly spoken of. The new principle discovered by M. Poitevin, that tannin, and similar oxidizable substances, act as sensitizing agents to insensitive iodide of silver, and supply the place of free nitrate of silver, is most important, and may probably be of great value in reducing to definite form the many vague ideas at present prevailing on dry plate photography.

Printing processes have occupied considerable attention during the year. The introduction of enamelled papers for securing a surface registering perfectly all the detail in the finest negative, was at first hailed by many photographers as a boon. When the sample of paper was good, the prints were certainly very delicate, and in many respects beautiful; but the uncertainty of the results, arising chiefly out of the imperfect preparation of much of the paper, and some other causes, have tended to give the enamelled papers a short-lived popularity, and they are now, we believe, rarely used. From the same cause, imperfect preparation, a paper which promised many advantages, for large pictures, in its freedom from gloss, and yielding fine vigorous prints, introduced under the name of amorphous albumenized paper, has been condemned as unsatisfactory. Gold toning processes have again been under examination, and amongst many photographers a decision in favour of the bath containing chloride of lime has been given, on the ground that it is simple, economical, and satisfactory in use. Fixing processes have been reconsidered, and M. Meynier's proposal to supersede the troublesome and readily decomposed salt now used, hyposulphite of soda, by the more stable sulphocyanide of ammonium, has excited much attention but the latter salt has not yet come into any extended use. One of the earliest objections made, the high price of the salt, has disappeared, as M. Meynier is now enabled to manufacture it at about one shilling and three halfpence per pound. One of the chief theoretical objections to its use arises out of the fact that the double sulphocyanide of ammonium and silver, formed in the process of fixing, is decomposed by the addition of water into sulphocyanide of ammonium and sulphocyanide of silver, the latter salt not being soluble in water, some traces of it are probably left in the print. This is, however, a point which will probably be decided better by practical experience than theory. We have prints in our possession, fixed with sulphocyanide of ammonium, and some fixed with sulphocyanide of potassium, eight months ago, perfectly free from all signs of fading or decomposition. This fact furnishes an argument in favour of sulphocyanides as fixing agents. Their stability, and the little danger which exists in their use of the liberation of any sulphuretting agent, and several other arguments, are strongly in favour of giving them a fairer trial than they have yet received. We hope, during the coming year, the subject will receive all the attention it deserves.

In connection with printing, the subject of weak silver baths has excited considerable attention. For some years past, until recently, a strong feeling has prevailed in favour of strong printing baths. A variety of good arguments in their favour exist, and it has been rightly held that they give greater certainty of good results than weak baths. An inquiry has been made during the year as to whether this certainty might not be obtained with a less expenditure of silver, and in many practical hands an answer seems to have been obtained that it might. We now find many extensive practical printers using thirty or forty grain baths, who, until recently, used seventy or eighty grain baths, and as they declare with equally good results. We here simply note the fact without entering into the general argument, which is too wide a subject for treatment in a glance at the year. The same remark is true of the proposed addition of nitrate of soda to the printing bath, and of Mr. Anthony's proposed bath of oxide of silver, dissolved in a solution of nitrate of ammonia. They are subjects which demand more full and careful consideration.

Carbon printing processes have made some progress, especially in the printing-ink process of Mr. Pouncy. In this process we have well marked gradation and half-tone in photographs obtained direct from the negative, the image being simply composed of printing ink. This in itself is a startling and important fact. That improvements in detail are desirable, in order to secure pleasing and artistic prints, is doubtless true; but it is equally true that these improvements are in progress, and that there is much to hope for from the process. M. Poitevin's new principle in carbon printing is also important. Instead of rendering a soluble substance insoluble by light, he works in the contrary direction. Carbon being mixed with gelatine is spread upon paper, is then rendered insoluble by the action of perchloride of iron and tartaric acid. The action of light upon such a film is to render it insoluble, and when exposed under a transparent positive, the lights are rendered soluble in water, and the half-tones become soluble in just such proportion as they have been acted upon by light. In this process M. Poitevin sees a better mode of obtaining half-tone than by the reverse method before adopted.

In photo-engraving the process of Mr. Dallas is the great fact of the year. The present number contains a specimen of the process and some remarks thereon. Photolithography has progressed rather in the extent of its application than in any special point of practice. Mr. Lewis has contributed some valuable hints on the subject to our pages. In France, two or three processes have been invented and patented. Two of these, one by M. Morvan, and the other by M. Marquier, are nearly identical in principle, and so far as we understand them, in no essential point different to the method of Messrs. Cutting and Bradford, patented in this country several years ago. Mr. Osborne is in Berlin, experimenting for the improvement of his own process, and some of the specimens we have received from him are as delicate and perfect as subjects in line well can be.

In the wet collodion process there has been very little change; bromo-iodized collodion and iron development are almost universally used. Iodized collodion with pyrogallic acid and formic acid developer, as used by Mr. Claudet, has attracted some attention, as yielding very rapid results, but the process does not seem to have superseded that in common use to any extent. The double sulphate of iron and ammonia, originally proposed as a developer in our columns has come into considerable and satisfactory use. The method published by Mr. Blanchard, of using a weak solution of iron with an equal part of citric acid, for intensifying, has been largely adopted.

Enlarging processes have been steadily improving. Mr. Stuart has, by his improvement in the solar camera, materially reduced the time of exposure for direct sun printing. Mr. Sydney Smyth has, by the use of a tinted paper, and by the occasional use of a modified plan of development, been enabled to get very artistic and fine results by development printing. And Mr. Aldis has succeeded in applying the oxyhydrogen light in solar camera printing with great success.

An important question in the economy of the art has received considerable attention during the year, we mean the recovery of silver from waste solutions and residues. It would form a very startling calculation, if it could be made with approximate correctness, to estimate the thousands of ounces of precious metal which has been thrown into the sewers, there to form an argentiferous lining, where it is gradually thrown down as sulphides, carbonates, chlorides, and other insoluble salts, or to be swept away into the rivers,

and finally to the ocean, and form an immense bath of iodide, bromide, and chloride of silver dissolved in sea water. Attention has at length been called to the importance and economy of recovering the silver from this waste. As only 2 per cent. of the silver used in its preparation is found in the finished print, it is but reasonable to suppose that a very large proportion of the original expenditure in silver may, by judicious care in collecting residues and recovering the metal therefrom, be saved from waste.

The applications of photography have been extending, in its use for ornamental purposes of various kinds, for book illustration, &c. In some instances, the illustrations given are worthy of the art, but in too many instances we have to regret the use of poor, coarse, hard reproductions in the place of good photographs.

The discovery of certain pictures, alleged to be photographs, produced during the last century, has excited much attention and much discussion, the details of which have been recorded in our columns. The subject is still open, and will shortly be further debated, when we hope evidence sufficiently definite to warrant a satisfactory decision will be forthcoming. The matter will be duly reported to our readers.

The Copyright Act, intended for the protection of the property of photographers in their own productions, has repeatedly been enforced during the year; and although the decisions in some instances have been far from satisfactory, there can be no doubt that the Act has put a serious check upon piracy.

The rage for card portraiture appears undiminished, and the quality of the pictures of this class has on the whole become decidedly better. The production of landscapes in large sizes has not been so extensive, the cabinet size of about 7 inches by 4¾ inches, introduced by Mr. Wilson, having become a very favourite size.

Abroad, photography appears to be progressing, several new societies have been established, and journals published in countries which had been hitherto almost destitute of photographic literature. In this country, societies in the provinces appear to be somewhat on the decline in numbers and activity, but prosperous in London. The literature of photography has received various additions, and the appliances of the art, various minor improvements, but not such as require comment here. The exhibitions of the year have been more excellent in contributions than remunerative in result.

The present year opens with every prospect of activity and prosperity in photography, and we wish each of our readers their full share of all the prosperity which is, we hope, awaiting the future of the art.

Critical Notices.

VIEWS OF SWITZERLAND AND SAVOY. Photographed by WM. ENGLAND.

Mr. England has returned from his few months' sojourn in the region of the Alps, with a stock of negatives of the charming scenery, the most perfect in photography, and the most uniform in excellence, that we have ever had the pleasure of examining. They consist of cabinet pictures, album views, and stereographs. The series before us, consists of the latter, 130 in number, issued under the special patronage of the Alpine Club.

There are, perhaps, few subjects which better repay the photographer with satisfactory results, than Alpine scenery, especially if he be working for the stereoscope, and it might readily have been anticipated, with Mr. England's well-known fine feeling and skilful manipulation, that his Swiss photography should be unusually beautiful. The results before us will satisfy the anticipations of the most sanguine. We have seen excellent photographs of Alpine scenery before, but we have met with none that approach these as pictures, and few that equal them as photographs. The admirable selection of subjects, the judicious choice of point of view, the rare fulness and gradation of tone, all combine to give this series unusual pictorial value. Perhaps, never was the value of a bromo-iodized collodion more triumphantly illustrated than in these pictures. We have here snow-clad peaks, and pine forests of deepgreen in the same pictures, each alternately in foreground and distance, rendered with perfect detail and softness. Here is the glistening, icy, broken surface of *La Mer de Glace* rendered with perfect texture, without an approach to chalkiness. Here are *Mont Blanc*, with a view of the *Chemin de la Tete Noire*, and a view of the *Wetterhorn*, each with foliage and figures in the foreground, and the snow-clad craggy summits of the mountains in the distance, rendered with equally tender gradations. Harmony is an essential quality of each picture, and there is not a white sky in all the pictures before us. In the more animated scenes on the Lake of Geneva, he is just as happy and successful. Some of the scenes on the lake, crowded with small craft, amongst which the feluccas with their wide stretching lateen sails are conspicuous, are very picturesque. On the lake also, we have some exceeding fine views of the Chateau Chillon, awaking memories of Byron's poem and Rousseau's romance. To detail all that is beautiful, and describe all that is interesting, would require many columns; we must, therefore, content ourselves by recommending to our readers the series as containing some of the most charming pictures, and of the most perfect photographic studies that have ever come under our notice.

INSTANTANEOUS VIEWS OF BRIGHTON, by VALENTINE BLANCHARD. London: C. E. ELLIOTT, Aldermanbury Postern.

Mr. Blanchard has long since taken prominent rank amongst the most skilful and artistic of instantaneous photographers. The series he has recently issued of Brighton will add to his reputation. We have here some of the most perfectly rendered instantaneous views of animated life as seen in the streets and on the beach of a fashionable watering-place, and some of the most picturesque effects of sea, and shipping, and cloud, and sun, and atmosphere which have ever come under our notice. Amongst the latter we have two or three perfect gems which have certainly never been surpassed, perhaps never equalled. No. 270, "Sunset on the Sands," is a thing to dream of. Some strangely fantastic clouds, low in the heavens, near the horizon, soft and vapoury, although dark, are fringed with a golden radiance relieving them against a delicate grey sky. The lights and shadows are repeated by their reflections in the watery sands from which the tide is receding. The greater part of the picture is in tender gradations of middle tint, but derives force and beauty from the nearly black pier which runs into the sea, and the sparkling lights of the golden-edged clouds. Nearly, if not quite equal in beauty, is 269, "A Sail at Sunset," which is an admirable composition of foreground and water, sunset clouds and their reflections in the water. The "sail" referred to in the title is the tiny toy skiff which some young boys are just launching in the shallow water left in the sands where the tide has gone down. No. 276, "A Promenade Concert on the Beach," with some hundreds of figures. No. 271, "A Coming Shower;" No. 274, "An Angry Sea;" No. 262, "King's Road, looking towards Kemp Town;" No. 277, "King's Road looking West," and some others, are all very noteworthy pictures. There are also some very fine views of that monument of the Fourth George's folly, the Pavilion. All the pictures are excellent examples of photography as well as art, brilliant, soft, and delicate, and most admirably printed and toned.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY, by T. FREDERICK HARDWICH. Seventh edition. Edited by GEORGE DAWSON, M.A., and EDWARD HADOW, F.C.S., M.R.C.S., London: JOHN CHURCHILL and SONS.

This work, the only manual in the English language

especially devoted to the Chemistry of Photography, ran through six editions under its author's own care and superintendence. Since his retirement from photography, about three years ago, there has been no new edition of the work until now. Of the two gentlemen whose names appear as editors, Mr. Hadow's is familiar to old photographers as one of the earliest who aided in giving precision to formulæ for the manufacture of collodion, and that of Mr. Dawson, more recently, as lecturer on photography in King's College. The task of editing a work which had in so many editions issued by its author, been received favourably, was doubtless a delicate one, requiring nicety of judgment in combining a fair account of the subtle modifications and direct changes in the theory and practice of the art occurring in three years, with a respectful regard for the views of the original author. The editors cannot be charged with a reckless disregard of what they found written, or a hasty adoption of new ideas or practices. Indeed, we are disposed to think that reserve in this respect has been carried too far, and that some account of modifications which have found much favour with many able photographers might with propriety be expected in a completely revised edition of such a work. We find no allusion to the question of weak printing baths, which has excited considerable attention of late; a 90-grain solution is given in the practical formula for printing on albumenized paper, whilst less than half that strength has been used for some time past amongst some of the ablest printers of the day. We find no allusion to the use of the double sulphate of iron and ammonia as a developing agent. We find no allusion to the use of chloride of lime in the toning bath, so highly regarded by many. We find but slight allusion either theoretical or practical to the use of sulphocyanides as fixing agents. And we find many more similar omissions. We find also the retention of ideas, long doubted, and we think almost exploded, such as that bromo-iodized collodion is less sensitive than simply iodized collodion, and that a thin collodion giving a pale thin film in the bath is best suited for the production of glass positives. Doubtless these ideas are retained, and those modifications omitted because the former are consonant with the views of the editors, and the latter are deemed unimportant or dangerous. But it would have been more satisfactory, we think, to have referred to the fact that such ideas were the subjects of discussions, and that such modifications were practised by some, even if a caution as to their doubtful value had been added at the same time.

There are, on the other hand, various additions of interesting matter to the work. Amongst these we may mention an extension of the chapter on lenses, in which, however, we should have been glad to see a little less looseness of idea in referring to the history of the triple. If the mere presence of three distinct members in the combination constituted the *differentia* in the subject of discussion, we believe a much earlier date might be assigned to the triple than is given in this chapter. One of the earliest photographic lenses, made long before the discovery of collodion, was a triple combination, by Dr. Goddard, of Philadelphia. But we conceive the real history of the triple lens, with the ideas now attached to it, dates from the period of its manufacture on definite principles for the cure of distortion.

Some re-arrangement of the work has been made to secure more scholastic propriety and sequence of ideas, and the index has been materially improved by increased copiousness and clearer arrangement.

SECURING CLOUDS IN LANDSCAPES.

We noticed a short time ago some very charming stereographic landscapes of English lake scenery, by Mr. Sproat, which were distinguished by exquisitely softly detailed foliage and foreground, and by also possessing fine skies and well defined clouds. Except when obtained by double printing, or in instantaneous pictures, which rarely possess much foliage, fine clouds are so rare in photographic landscapes, and when present are so frequently accompanied by under-exposure of foliage and foreground, that we were induced to make some inquiry as to the method used in obtaining them. From Mr. Sproat's answer, we learn that he simply works the wet collodion process after the usual and approved fashion. The chief noteworthy point in the manipulation consists in the development, in which care is taken to develop and to intensify the foreground more than the sky. This mode of proceeding has been practised and recommended before; but judging from the rarity of clouds in photographic landscapes, the method does not seem to have met with the attention it merits. As Mr. Sproat's communication is short, we will, at the risk of repeating some well-known details, print the whole. He says:—

In the first place, I wish to inform you that I have nothing new to communicate, but I commenced this process as soon as iron development came into popular use, and have stuck to it like a brick ever since. I think the only way to succeed well in photography is to get hold of a good process, and stick to it, instead of changing from one to another. I feel confident there would be more successful photographers than there are at present, if they were to follow the same rule.

I use Rouch's bromo-iodized collodion, prepared by Hardwich's formula.

Nitrate Bath Solution.

Nitrate of silver	700 grains.
Spring water	20 ounces.

Filter the above into the bath, then immerse a collodionized plate, and let it remain for a few hours; if the solution be acid, it generally works well without any further treatment; if not, make it slightly so with nitric acid.

Developing Solution.

Protosulphate of iron	15 to 20 grains.
Acetic acid	15 minims.
Alcohol...	quantum suff.

With an ordinary good light, I generally expose from 4 to 6 seconds, with a pair of Ross's single lenses, 4½ inch focal length.

I think there is more skill and judgment required in developing than in any other part of the process, as a negative, from carelessness or bad judgment, is easily spoiled, that might otherwise have been a good one. I flow the developer over the plate, and watch it very carefully, and generally find the foreground to require more developing than the sky and distance; but by keeping the solution more on foreground, I get the detail out, and preserve the sky and distance.

When the negative requires intensifying (which is not always the case), I intensify with two grains of pyrogallic acid and one grain of citric acid to the ounce of water, with the addition of a few drops of a ten-grain solution of nitrate of silver.

The same rule applies to this part of the process as to developing. It generally happens that I have to intensify the foreground most, and keep the solution from the sky, particularly if there be clouds, otherwise I am apt to lose them by over-intensity.

I carry both hyposulphite of soda and cyanide of potassium to fix with, and use them according to circumstances. If the negative appears too dense, I use the cyanide; if not, I use hypo, and wash in plenty of water.

Windermere, Dec. 9. R. J. Sproat.

A FEW WORDS ON DELINEATION.

by duncan c. dallas.

In the science of delineation, pure Nature is one thing, pure Art another; and quite dissimilar from either is the happy union of Nature and Art. Hence we have three distinct principles to guide us—the literal, the formal, and the artistic. I use the two first of these expressions in no inferior sense. For, to represent Nature as she is—literally—is no mean acquirement. And, again, is not pure Art the very poetry of form—Imagination, expressing in fittest way her great inspirations? In employing as above the term artistic, I wish to indicate not merely pure art delineation, but rather that delightful combination of nature and art, in which pictures of nature become not merely literal translations

but poetical renderings; and, conversely, that combination of art and nature in which the forms of pure art are not merely poetry, but poetry with that exquisite touch of nature which makes us feel akin with the artist.

Much has been written on the subject of photography in relation to art. Some refuse it all recognition as a branch of the Fine Arts. Others claim for it more than it is entitled to receive. I think the *via media* may be found by considering the principles I have just endeavoured to state. What can photography do? The young giant can do much, and its capacity is ever on the increase. I shall content myself with enumerating a few of its salient powers.

In the first place, photography can give us, with the exception of colour, *almost* a literal copy of Nature. The most careful and patient draughtsman must here yield the palm, unhesitatingly.

In the second place, photography can copy faithfully the forms of pure art save when colour interposes (as at present) a physical barrier.

Thirdly, Photography can copy faithfully, except as regards colour, works in which Nature is wedded to immortal Art.

But photography, or rather the photographic artist, aims higher. He does not wish to be simply the most accurate and versatile of copyists. He is eager to use his wondrous machine and chemistry as the painter employs his brush, his pencil, or his crayon—as the *means* of translating his thoughts. He would have us read a newer and grander poetry of Nature than artist ever attempted by his feeble and yet facile brush. The object is indeed a worthy one. But can it be attained? Perhaps not exactly as the enthusiastic photographer aspires. And yet it may be attained in a high degree, though in a direction differing altogether from that pursued by the painter or his congeners.

At the very best, the painter gives an untrue picture of nature. His poetry frequently leads us to overlook violations of natural truth. Photography, on the other hand, will always have the charm of truthfulness. Where the photographer is a man of poetical mind, possessed of "soul," we have increasing proofs that the artistic principle may find a second and a valuable exponent, differing *toto cœlo* from that which has been hitherto employed—the hand wielding the brush or pencil. This by no means implies that Raffaelle's vocation is gone. Photography may strike out—nay, is striking out a new field of art in the very highest sense, without superseding what has been done, or may yet be done, by the painter.

The difficulties which photography as a branch of art-nature now encounters, are being overcome by new discoveries in physics, chemistry, optics, and mechanics. He would be a bold man who should venture to assert that all important progress in the art was at an end. Still we must not blind our eyes to the difficulties which at present operate to exclude photography from its fair rank in the world of art.

In the first place, we have the false rendering of distance which the actinic, as well as the non-actinic, colours occasion.

Secondly, a similar defect arises from the unequal play of light and shade, inherent in some objects.

Thirdly, colours are the *bête noir* of photography, spoiling what would otherwise be gems.

And, lastly, there is the difficulty of obtaining in landscapes the proper representation in one and the same picture of cloud, sky, water, and land, with all the varied objects distant and near in their due harmony.

Other difficulties will too readily occur to the mind. Now, all this naturally raises the question, "How far is it legitimate to employ extraneous aid to improve photographs?"

I think I may best illustrate and answer the question by drawing attention to a kindred subject. In the engraved photograph which I have the pleasure to submit with the present number of the PHOTOGRAPHIC NEWS, the only tool that has touched the picture has been for the purpose of cleaning the lights. Nothing has been done to render the plate anything else than a reproduction of the original photograph by means of carbon ink and the copper-plate press. In all respects save one, viz., the very extreme darks—in this photograph very dense—I believe I may safely say that nothing appreciable has been lost. Under the arch the original photograph is a black mass by reflected light, but showing by transmitted light the details seen in my reproduction. I have since overcome the difficulty of obtaining an absolutly dense black. I issue this specimen free from all touching-up.

Beautiful, and almost perfect, as the original photograph by Mr. Bedford undoubtedly is, it is incomplete as a work of art nature. A great improvement would be the introduction of sky and clouds. A few artistic touches would render the thing perfect. Having got so nearly perfect a result, would it be heresy to do what is required with the brush? Or, having got the picture *in ære perpetuo*, would it detract in the least from its value if the aid of the engraver were called in to make it really a work of art-nature? For my part, I think we may, if we wish photographic things of beauty to be joys for ever. It is always possible to avoid the meretricious, and that is the only danger to be shunned. The object to be sought is to produce something *beautiful*, as well as true. I consider it no slight advantage of my own process that the plates can serve as a basis for the artist engraver to introduce special engraved effects, or to remedy the acknowledged deficiencies in photography. This work is widely different from that in which the engraver has to make good radical defects, such as loss of details and half-tones.

I shall rejoice if my efforts, in the direction in which I am now working, lead to the promotion of the art interests of photography. When I reflect how much photography owes to the free communication of ideas, I feel sometimes almost criminal in not making known the details of my process. I salve my conscience, however, by the reflection, that having sacrificed much for my hobby, it is time to think of making it repay me. If successful after a few years, and the process is not discovered, or a better one invented, I hope to be able to afford others, for a moderate consideration, the opportunity of working the process.

RESEARCHES ON POSITIVE PRINTING.

BY MM. DAVANNE AND GIRARD.

TONING.*

§ 2ND.—TONING WITH NEUTRAL CHLORIDE OF GOLD.

To obtain the toning with neutral chloride of gold, we employed the double chloride of gold and potassium. This salt, recommended by M. Fordos, several years ago, is now generally to be met with among dealers in photographic materials: unfortunately, it is not always pure, and we have met with more than one sample which, upon opening the bottle containing it, exhaled a strong odour of chlorine, arising from excess of *aqua regia*. This defect must be carefully avoided, and to guarantee it the consumer must insist, whenever possible, that this salt be supplied to him in large and well-formed crystals. If, notwithstanding this precaution, the double chloride of gold and potassium does not exhibit perfect neutrality, it will be easy to overcome the inconvenience presented by its acidity, in taking care, as we have done in the course of this study, to saturate the excess of acid in the bath itself by means of a small quantity of chalk.

In submitting positive proofs, fixed and not fixed, to the action of the toning bath, prepared under these conditions, and pursuing the general routine previously described, we have obtained the following results:—

* Continued from page 570, vol. vii.

Toning after Fixing.

Proofs upon Paper simply Albumenized.

Time of Exposure.	Numerical Order.	Numerical Results.	Results of Experiments.
2 Hours.	No. 17. Portion not toned.	Ag ..... 0·170	0 gr. ·021 of gold equivalent to 0·035 of silver, the toned portion (No 18) should contain 0·170 − 0·035 = 0 135 of this metal; but experiment gave 0 134; in this case, therefore, we find the proportion of silver ..... 0·001 deficit.
	No. 18. Toned portion.	Ag ..... 0·134 Au ..... 0·021 Ag + Au 0·155	
15 Minutes.	No. 19. Portion not toned.	Ag ..... 0·077	0 gr. ·015 of gold equivalent to 0·025 of silver, the toned portion (No. 20) should contain 0·077 − 0·025 = 0·052 of this metal; but experiment gave 0·049; in this case, then, we find the proportion of silver ..... 0·003 deficit.
	No. 20. Toned portion.	Ag ..... 0·049 Au ..... 0·015 Ag + Au 0·064	

Proofs upon Paper Salted only.

2 Hours.	No. 21. Portion not toned.	Ag 0 275	0 gr. 058 of gold equivalent to 0·095, the toned portion (No. 22) should contain 0 275 − 0 095 = 0 180 of this metal; but experiment has given 0·184; in this case, then, the proportion of silver is 0·004 excess.
	No 22. Toned portion.	Ag ..... 0·184 Au ..... 0·058 Ag + Au 0·242	
15 Minutes.	No. 23. Portion not toned.	Ag ..... 0·088	0 gr. ·027 of gold equivalent to 0·045 of silver, the toned portion (No. 24) should contain 0·088 − 0·045 = 0·043 of this metal; but experiment has given 0·041; in this case, then, we find the proportion of silver ..... 0·002 deficit.
	No. 24. Toned portion.	Ag ..... 0·041 Au ..... 0·027 Ag + Au 0 068	

The results comprehended in the preceding eight essays are remarkable, and deserve to fix attention. They show in the clearest manner, and better than any other experiment could, that in toning, as in all the other phases of photographic study, the results are accomplished with all the regularity of chemical laws. Here, in fact, the divergences observed between the quantities of gold and silver which calculation assigns to the toned proofs, and those whose presence we have proved, are really trifling (from 0 gr. ·001 to 0 gr. ·004), and they may be attributed to errors of analysis, inevitable when the operations take place upon such minute quantities. Besides, it must be remarked that the case of a toning with neutral chloride of gold, on a proof previously fixed, is that which approaches nearest to the theoretical conditions, and where we have least to apprehend from accessory phenomena.

Toning before Fixing.

Proofs upon Paper simply Albumenized.

Time of Exposure.	Numerical Order.	Theoretical Results.	Results of Experiments.
2 Hours.	No. 25. Portion not toned.	Ag ..... 0·137	0 gr. ·017 of gold equivalent to 0·025 of silver, the toned portion (No. 26) should contain 0·137 − 0·028 = 0·109 of that metal; but experiment gave 0·115; in this case, therefore, we find the proportion of silver ..... 0·006 excess.
	No. 26. Toned portion.	Ag ..... 0·115 Au ..... 0 017 Ag + Au 0·132	
15 Minutes.	No. 27. Portion not toned.	Ag ..... 0·065	0 gr. ·009 of gold equivalent to 0·014 of silver, the toned portion (No. 28) should contain 0·065 of this metal; but experiment gave 0 054; in this case, then, we find the proportion of silver ..... 0·003 excess.
	No. 28. Toned portion.	Ag ..... 0·054 Au ..... 0·009 Ag + Au 0·063	

Proofs upon Paper Salted only.

2 Hours.	No. 29. Portion not toned.	Ag ..... 0·247	0 gr. ·039 of gold equivalent to 0 064 of silver, the toned portion (No. 30) should contain 0·247 − 0·064 = 0·183 of that metal; but experiment gave 0·199; we find, in this case, the proportion of silver ..... 0·016 excess
	No. 30. Toned portion.	Ag ..... 0·199 Au ..... 0·039 Ag + Au 0·238	
15 Minutes.	No. 31. Portion not toned.	Ag ..... 0·084	0 gr. ·019 of gold equivalent to 0·027 of silver, the toned portion (No. 32) should contain 0·084 − 0·027 = 0·057 of that metal; but experiment gave 0·061; in this case, then, we find the proportion of silver to be ..... 0·004 excess.
	No. 32. Toned portion.	Ag ..... 0 061 Au ..... 0·019 Ag + Au 0·080	

The essays relative to the toning by neutral chloride of gold before fixing are, as the above table shows, perfectly concurrent with each other; but the analytical results to which they lead are very different from those obtained when toning after fixing. While the latter lead to the proof of an atomic substitution of gold for silver, the former differ notably from the data which theory prescribes. We must in fact, recognize that upon a proof toned with neutral chloride of gold after fixing, a proportion of silver *always* remains which is greater than that which the deposit of gold should have made to disappear, and that this excess, sensibly proportional to the richness of the sheet not toned, represents about a twentieth of the quantity of silver the latter contains.

To explain this result, apparently abnormal and contrary to theory, we must modify the statement, and consider as the excess, not the silver that remains, but the gold deposited upon the toned proof. In placing it at this point of view we soon recognise the cause of the anomaly. We know that the proof washed in water, on its removal from the printing frame, still retains, whatever care may be taken, a certain quantity of free nitrate of silver, which water alone cannot remove, but which remains adherent to the fibres of the paper, as well as to the chloride of silver, and the coloured portions of the proof. There is, on the other hand, a well-known reaction in putting in contact two solutions—one of nitrate of silver, the other of chloride of gold—the chloride of silver formed carries down, in an insoluble state, all the aurie acid, $Au\,O^3$ which this double decomposition sets at liberty. It is to this reaction that the excess of gold is due, the presence of which we have proved in the circumstances now under consideration; an excess which, however, we constantly find in the tonings before fixing where no free acid figures. Upon the first contact of the proof with the toning bath, a double decomposition takes place between the chloride of gold and the nitrate of silver with which the paper is impregnated. A certain portion of aurie acid is deposited without causing an equivalent proportion of reduced silver to pass to the state of soluble chloride in the fixing bath—and remaining side by side with the gold which is afterwards deposited by regular substitution—is spontaneously reduced in its turn, during the toning, producing, in consequence, a slight excess in the numbers indicated by theory.

But if we leave out this accessory phenomenon, we must admit that, in a case of a toning by neutral chloride of gold before fixing, the substitution of the gold for the silver takes place regularly according to the law of equivalents, as when the toning takes place after fixing.

Tonings with neutral chloride of gold, that is to say, based upon the employment of the double chlorides recommended by M. Fordos, proceed with great regularity, especially when care is taken to remove the last traces of acid they may contain by the addition of a small piece of chalk. They give excellent tones, and the baths present very great stability. After the lapse of a certain time, however, they lose colour, and at last precipitate a part of the gold they have dissolved; we shall soon show that this slow alteration, due, doubtless, to the presence of organic matters dissolved at the first toning, commences by a reduction of the per-salt of gold to the state of proto-salt.—*Bulletin de la Société de Photographie.*

ON THE BEHAVIOUR OF PURE IODIDE OF SILVER IN THE PRESENCE OF LIGHT.

BY M. MC. A. GAUDIN.

THE publication of the researches of Hermann Vogel, on the chloride, bromide, and iodide of silver, in presence of light, has induced me to follow with some observations tending to show that the sensibility or insensibility to light of iodide of silver, proved by the author, may be wholly attributed to the presence, in the first case, of an alkaline iodide, in very minute, but sufficient, known quantity, to produce insensibility, especially when it is iodide of potassium; and in the second case, the well understood sensibility of iodide prepared with excess of nitrate of silver, may be attributed as well to the iodide alone as to the presence of nitrate of silver; for, with an iodide prepared with excess of iodide of potassium, we may always expect its presence, which is so powerful; and it is almost impossible for this presence not to take place, for we know that finely divided precipitates can never be entirely purged from a soluble salt, which has bathed them at the time of their formation. We must therefore operate upon iodide of silver entirely, except from every alkaline iodide and from nitrate of silver, or any other silver salt. These means are found perfectly realized by employing iodide of silver prepared by the direct action of iodine upon silver, which I have mentioned several times under the title of photogenic powders. I have always operated with an iodide, accompanied with nitrate of silver, but in the ensuing case we must rigorously banish the latter.

To prepare thus an iodide of this species, and being hurried to obtain it, and give an account of it the same day, I have simply put the iodine in grains at the bottom of a thick capsule, maintained by a quantity of warm sand at a temperature near its point of vaporization, covering this layer of odine with silver foil in fragments, without any intermedium; by this means, next day the silver was almost wholly converted into iodide; I say almost, because there is still found in the mass some brownish flakes, which are sub-iodized, but I satisfied myself that for the use I had to make of it, this sub-iodide would cause no inconvenience. The reason of this is, briefly, by rubbing it with a tuft of cotton or paper; it does not at all adhere to the paper, like the transparent yellow iodide, which, on the contrary, is remarkably unctuous, and the sub-iodide remains wholly floating on the surface of the paper, from which it may be driven by tapping the sheet at the back, or by passing a feather or a hair pencil over its surface.

I have thus slowly prepared a dozen sheets of suitable dimensions, to make of each two printings from a stereoscopic negative. I have operated naturally, by the simple light of a candle, and I perceived that we can thus cover the paper with a coating as thin or as thick as may be desired, and it is only on the next day that I have been able to see in broad daylight the natural colour of this iodide, which i a yellow, inclining both to green and to grey. After interposing a negative in a printing frame as usual, I exposed it to light, and attentively watched its colour beyond the negative. After an hour's exposure, which appeared to me an extravagant time (notwithstanding the weakness of the light during these winter days), on account of the peculiar sensibility of the iodide whenever it is exposed, I observed no change in appearance of the tint from its first aspect before opening the frame.

But I thought it would be quite otherwise under the negative, as always happens, no matter what the photogenic substance, after a long exposure; but I carefully scrutinized it by the light of a candle, very near the flame, inclining the paper in all directions, yet I could discover nothing. It then remained to prove it by developing agents. I had prepared before hand some gallic acid, acidulated with acetic acid; then this same gallic acid with the addition of nitrate of silver, but in very large proportion; lastly, pyrogallic acid, also acidulated with acetic acid: but my paper, cut into three parts, underwent these three tests without exhibiting the least sign of action whatever; therefore this time it could well be said that *pure* iodide of silver, that is to say, entirely isolated from every kind of foreign substance, is *completely insensible to the action of light.* I have already stated this fact several times, but the mode in which it is prepared did not authorize me to be so affirmative as I can be in the present case.

This proved, I have previously submitted these sheets iodized, and successively exposed to the vapours of nitric acid, hydrochloric acid, and ammonia; the last only presented the sign of a picture, after a very long exposure, but nothing striking appeared. After placing the sheets of paper upon a silver bath, the picture appeared before and after the use of the continuing bath; but in this case, having employed some sized paper, I cannot say what part of the action was due to the iodide of silver alone. All this taken into consideration, we may absolutely conclude that iodide of silver owes its sensibility either to the substances with which it is found associated, or to the influences to which it is submitted at the moment of its formation. We cannot yet decide between these two causes, so subtle are the molecular actions. Thus we should be tempted, in the present case, to perfectly assimulate the iodide of silver I prepared, and upon which I have operated, to that which covers the silver in the Daguerreotype, but in the latter case no molecule of silver is isolated; we might almost say that the coating contains iodide on the outside and silver in the interior. A connection exists between all the molecules in the compound body as well as in the metallic body. A phenomenon of cementation takes place, which cannot exist in the normal iodide, and this is why the former becomes inert under the same conditions where the latter undergoes indefinite changes, as is proved by the successive tints while the silver is taking the iodine as well as during the luminous perturbation.

These phenomena have become very familiar by frequent repetition, still they constitute one of the most beautiful spectacles of physico-chemical science. We may readily imagine, then, that there is a molecular disturbance, but we are very far from being able to define it; hitherto it has escaped analysis, although it rests upon a simple binary compound. M. Vogel asserts that everything takes place without any chemical transformation, since neither elimination of substance nor metallic residue are apparent. Nevertheless there is a change of colour which will only be a permutation of atoms in the substance of the molecule.

The pure iodide I obtained, and of which a considerable quantity remains, will serve me to pursue my inquiry. For example, instead of spreading it alone I shall add pulverized nitrate of silver to it, and after mixing the whole together I shall apply a jet of steam to its surface, which, by condensing, will liquefy the silver salt, and dissolving the iodide to the highest degree by an effect of temperature and contraction, will produce great sensibility. This employ-

ment of steam can be made at any moment, and till then the paper is free from any change by time, hence a very convenient process may be derived for miniature pictures, and the thousand fancies of amateur photographers.—*La Lumiere.*

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, December 29th, 1863.

Professional photographers here are almost in a state of despair at the state of the weather. The great day of Paris, *le Jour de l'An*, New Year's Day, is fast approaching; their ateliers are crowded with anxious sitters, whose portraits must be ready in time for new year's gifts, and there is scarcely any available light. Perfidious Albion appears to have sent us over a consignment of the very worst November weather, and discharged it in Paris generally. Seriously, the weather has been very bad. We have had an unusual share of thick, foggy weather, of which photographers have complained loudly and bitterly.

At the last meeting of our Photographic Society, M. Arthur Chevalier exhibited an apparatus for enlarging positives, termed a *megascope*, which he stated to be a modification of an apparatus constructed in 1844, by his late father, M. Charles Chevalier. The lenses composing the original apparatus, were plain convex, the plain surfaces receiving the luminous rays. The pictures obtained were generally curved in their contours, although the interior details were satisfactory.

In perfecting his father's idea, M. Arthur Chevalier has succeeded in giving rectilinear contours to the proofs; the light is reflected direct upon the negative to be enlarged, contrary to the usual practice, which consists in lighting it by refraction. The rays which proceed from the negative immediately traverse an achromatic series of lenses; then they arrive at *the convex surfaces* of the series of plano-convex lenses which produce the enlargement. The author has analyzed the effect obtained by means of this apparatus, and he has recognized that in most cases every portion of the image is situated on the same plane. M. Arthur Chevalier has also been engaged for some time with an interesting application of this method in the reproduction of anatomical preparations in enlarged proofs.

MM. Davanne and Girard read a continuation of their important researches upon toning positive proofs. M. Emile Placet, civil engineer, explained his new heliographic process. It is based upon the well known action of light upon bitumen, and a mixture of gelatine and bichromate of potassa or of ammonia. The light passes through the negative on to the side of sensitive film adhering to the glass plate, which being worked in a suitable solvent, leaves a picture in relief; this being moulded, and then immersed in a galvanic bath, gives an engraved plate of the subject to be copied. The original part of the process consists in applying the light through the bottom of the sensitive coating, instead of on the top of it. In the old method, the half-tones and delicate points of the photograph were weak or lost, because the light did not penetrate sufficiently into the substance of the coating, and were removed during the washing of the plate.

Having a negative on glass, the sensitive coating is poured direct on to it, and then exposed to the light, as in printing a positive; the luminous action commences at that part of the sensitive film next to the negative, consequently when the plate is washed with the solvent, a complete insoluble picture remains, varying in thickness according to the intensity of the light in its several parts.

When plaster of Paris is poured on to this insoluble picture, the minutest details are reproduced in the mould, from which a copper-plate may readily be taken by the electrotype process.

An engraving can be substituted for a photographic negative, and treated in the same manner, yields a mould, and, subsequently, an engraved plate in *fac-simile*, and silver-soap may be substituted for gelatine—its action being more prompt.

M. Hamy addressed a letter to the society respecting methods which he hoped to see succeed, for the destruction of the last traces of the sulphur compounds left in positives on paper by hyposulphite of soda. He says: "I have already made some experiments on the subject of my note. Everything happened as I expected, but the process cannot be employed by everybody; there are practical difficulties which only a photographic chemist can readily surmount." I beg you then to take note of a modification by the aid of which I expect soon to arrive at the desired aim. The chlorine must be replaced by aldehyde or oxygenated water: as soon as I have made further experiments, I shall lose no time in communicating the result.

Professor Balsama, of Lecca (Italy), addressed the following note, upon a method of toning, without salts of gold:—

"The salts of gold are at present the only salts employed to give a bright, clear and harmonious tone to photographic proofs. Recourse has been had to platina and mercury, but neither of them attain the vigorous and velvety tint of gold, so pleasing to the eye. After many experiments, I have observed that the salts of bismuth, especially the nitrate, give an agreeable and vigorous tone, which may be compared to the skin of the chestnut, with depth in the shades and transparency in the half-tones. Nitrate of bismuth is not wholly soluble in water, consequently, the bath being weak, the proofs were kept in it a long time, they are consequently a little damaged in the details of the half-tones. Still with the nitrate alone, and taking proper precaution, I have obtained a good toning, as may be seen from the proofs enclosed. To avoid this inconvenience, I have added some acetic acid to the bath, which dissolves the sub-salt formed. The bath of aceto-nitrate of bismuth respects the details, however delicate they may be, and it often reveals parts that were latent. It presents a variety of tones from the lightest to the deepest, resembling the pastels of the Boulogne school.

"I submit to your inspection proofs obtained by this new toning in December, 1861, which have not faded. The difference of hue depends on the difference in manipulation, which I shall be happy to communicate if required."

The President (M. Regnault) remarked that the new process appeared to him to present two dangers: one being the disappearance of the half-tones; the other, the formation of sulphur compounds of silver, in consequence of the reaction of portions of the acid baths adhering to the paper upon the hyposulphite employed in fixing. The following note was from M. Gobert;—

"It is very difficult to find in common perchloride of iron prepared in a manner suitable for employment in the interesting process of photographic printing invented by M. Poitevin. I procured many specimens of this product without ever finding one that satisfied me. I had to prepare it myself, and the following is the method which succeeded best:—

"Commercial sulphate of iron is treated with excess of ordinary nitric acid, so as to form sulphate of peroxide of iron. The excess of acid is saturated and precipitated by ammonia. The very light precipitate is washed in a suitable vessel. We then decant the water, and wash many times, so as to remove the nitrate and sulphate of ammonia produced by double decomposition. The peroxide is placed to dry, and afterwards reduced to powder. It will keep for an indefinite time.

"When about to prepare the sensitive liquor, weigh 9 grammes (139 grains) of this peroxide, which is dissolved in hydrochloric acid, so as to give a neutral solution. This operation may be performed cold in a test glass, by placing it against the light, it is easy to perceive the moment when no more acid is required to be added. The solution is then

diluted with water, so as to make 100 cubic centimetres (3½ fl. oz.), and then 9 grammes of tartaric acid is added.

"The liquid prepared under these conditions works well. The plates which are covered with it retain the carbon and other powders perfectly. When the time of exposure is appropriate, the pencils filled with the dry powders are brushed lightly over the surface, and the picture is formed with marvellous rapidity.

"But it is not so with commercial products. They receive the action of light well; the transformation of the perchloride of iron into proto-chloride takes place perfectly, but the new substance formed attracts almost no humidity from the atmosphere, consequently the powders do not adhere. This is a curious action, well worth studying. Besides, I should say that the perchloride of iron, prepared as indicated above, no longer works well when evaporated so as to have it *en masse*. It is preferable to make the solution cold. One of the advantages arising from the employment of peroxide of iron is that this body is very stable, while the perchloride in crystals, or in the lump, is extremely deliquescent, from whence results a continual variation in the strength of the preparation of the sensitive liquors."

M. Aimé Girard remarked that the specimens of formic acid found in commerce are generally diluted: their strength rarely exceeds 10 per cent.; besides, this dilution is very variable, hence the impossibility of the photographer's applying usefully the formula hitherto published for the employment of formic acid.

Impressed by this inconvenience, M. Girard proposes to prepare a densimetric scale of the strength of diluted formic acid, as soon as certain specimens of formic acid expected shall have arrived.

Proceedings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL Meeting of the Amateur Photographic Association was held on the 21st ult., at 12, York Place, Portman Square, G. V. Gooch, M.T.C.E., in the chair.

The minutes of the last meeting having been read and confirmed, the following members and subscribers were proposed and elected:—

The Countess of Ranfurly; Adam McAdam, Esq.; Captain J. H. Murray, R.N.; Rev. Arthur Rigg; Stephen Moore, Esq.; Miss Moore; Robert Coote, Esq., R.N.; C. J. Marriott, Esq.; F. J. Hayward, Esq.; F. H. Lloyd, Esq.; Miss Gore; Captain C. W. Tupper; Alexander Abercrombie, Esq.; Dr. Wilson; L. Hill, Esq.; J. Laird, Esq.; T. M. Jenkins, Esq.; T. J. Sturt, Esq., M.D.; Mrs. P. Mildmay; William Owen, Esq.; Captain W. H. Mason; T. O'Neil, Esq.; St. John Coventry; C. J. Moss, Esq.; Mrs. Knight Bruce; Mrs. Thompson; Alex. Gray, Esq.; W. J. Herschell, Esq.; J. S. Ross, Esq.; Dr. Abercrombie; J. Rashleigh, Esq.; A. Orr, Esq.; Captain George Bankart; N. Turnstall, Esq.

The secretary then laid before the council the articles selected as prizes, which had been awarded at the previous meeting, and stated that they would have been ready much sooner, but for his long and serious illness. The prizes consisted of a handsome silver goblet, Major Gresley; a teapot and coffee-pot, Baynham Jones, Esq.; a silver inkstand, W. D. Chidson, Esq.; a silver inkstand, A. Henderson, Esq.; an elegantly-bound album, Captain Impey; an elegantly-bound album, T. W. Rimington, Esq.

The question of an exhibition of the society's pictures was again discussed, but nothing was actually decided relative thereto.

The proceedings then terminated.

A. J. MELHUISH, Hon. Sec.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting was held on Wednesday evening, December 23rd, Mr. G. Shadbolt in the chair.

The minutes of a previous meeting were read and confirmed.

No paper having been provided, the proceedings were chiefly of a desultory and conversational character.

Mr. WHARTON SIMPSON exhibited some of Mr. Pouncy's transferred printing-ink photographs, and made some explanations of the *modus operandi*. An interesting and animated conversation ensued, in which the chairman and several members took part.

The CHAIRMAN read a letter from Mr. Ross, calling attention to a couple of fine imperial photographs, by Messrs. Southwell Brothers, of Madame Ristori and Captain Speke, taken with his lens of 6 inches diameter, 24 inches back focus, and 3 inches aperture. Also to some further views of the interior of the Crystal Palace, by Messrs. Negretti and Zambra, with his No. 2 actinic triplet, 9¼ inches equivalent focus, and aperture 4-10ths of an inch.

The CHAIRMAN exhibited some very finely defined enlarged photographs of microscopic objects, by Dr. Maddox; also some fine card pictures, by Mr. Melhuish; and some very charming stereoscopic pictures, by an amateur using the modification of the Fothergill process, proposed by Messrs. Bartholomew and Hannaford, and since further worked out by Mr. Fothergill. These views were distinguished by great delicacy and detail, with fine clouds and perfectly rendered foregrounds, and excited much admiration and comment.

After some conversation on rapid dry processes,

Mr. SIMPSON exhibited a portrait taken with 15 seconds exposure in a dull light, with a No. 1 B card lens and half-inch stop.

The CHAIRMAN remarked that, at some time, probably rapid dry plates would become a regular article of commerce for portraiture, and would possess many advantages for that purpose.

After some further desultory conversation on the subject, in the course of which Mr. Simpson stated, in answer to a question, that Mr. England had not used dry plates in his recent professional tour in Switzerland, it was announced that, at the January meeting, Mr. Godbold would read a paper on the restoration of faded prints.

The proceedings then terminated.

Photographic Notes and Queries.

NITRATE OF SODA IN THE BATH.

SIR,—Without at all wishing to depreciate the experiences and hints of your correspondents, more especially the "Photographic Assistant" who has lately given us so many excellent hints in your paper, and, by the bye, assistants (with their hearts and minds in their employers' interest and in the study of the art) ought to be able to give good information on new processes, for it very often happens that the employer frequently more than intimates that the innumerable failures which will attend new processes are caused by negligence of the assistant (of course, sometimes they are so). They, therefore, have a double interest in discovering the why and wherefore of this or that failure, &c.; still, in a comparative new art, and certainly in a new bath like the nitrate, soda, and silver, we must not jump at hasty conclusions, especially if all experiments have been conducted with the same good albumenized paper. I have myself conducted several experiments with the same bath and various papers, and am still very doubtful of the causes of failure in some cases and success in others, but doubt not that the quality of the paper is the chief cause of trouble.

To begin, I made a bath—

Nitrate silver	...	...	...	30 grains
Pure nitrate soda	...	...	...	60 „

I always float three minutes.

With the common French paper, I got the pleasant result of pictures in the most virulent state of measles, or more like the red mottled soap of chemists windows; this paper was very poorly albumenized. I then tried two or three bits of the enamelled paper, on same bath, after a whole day's exposure, fine weather, negative moderately dense, I obtained a faint outline of the shadows of the picture only.

I now took a well albumenized paper, by a good English maker, and obtained perfect results, on the same bath and same toning, &c., &c. To make sure that this was not caused by the more perfect assimilation of the two nitrates, I again tried the French paper, with the same woful results of mottling. Three or four days after, the good English paper manifested the same tendency to mottle in the shadows, but by strengthening the bath again with the same proportion of 50-grain silver and 100-grain soda I again got good results. Still fancying that

the prints were not so brilliant as formerly on silver bath only, when signs of mottling again reappeared I tried the addition of strong silver only, with perfect success. My present conclusions would be, that by the use of this bath one saves silver, but its saving is by no means worth making at the risk of the very great uncertainty which attends it, unless you obtain an uniformly good paper. I confess that I am a mere novice with the bath, for I consider that in this case the introduction of nitrate soda is such a new article introduced that without numerous experiments it is not yet safe for any one to condemn too quickly or praise too highly. With slight modifications or additions it may ultimately turn out the finest results. If any part of this lengthy epistle is worthy of your publishing, and any further experiments with the bath may prove serviceable, I shall be most happy to communicate them when I have again made a series of experiments.—Your most obedient servant, A. D. E.

Front Light and Side Light.

Sir,—In just conning over my paper on the construction of glass rooms, reported in the News, I perceive you in a foot-note state that I am in error in supposing that either M. Disderi's, Mr. T. R. Williams', or Mr. Rejlander's pictures are lighted by front light. Well, it may be an error; if it is, I shall be compelled, henceforth, to "disbelieve my own eyes."

The difficulty appears to me to lie in the question of, "What is meant by a front light?" I contend that all light entering at a long angle in front of the sitter is literally front light; it matters not whether it comes from the side (and more especially when, as in the case of Mr. Blanchard, the background is placed *diagonal* to the room and opposite the window), or light from the top, as is the case with Mr. Williams.

The light in Rejlander's studio, which you say is not a front light, is precisely similar to that in the room of Col. Stuart Wortley's, which you describe as "the front light" (see Photographic News, Dec. 18, page 603).

In Mr. Rejlander's room a great number of his finest pictures are taken with a small light entering direct and immediately in front of his model, all other light being entirely shut out. But apart from all this, the *cast* shadows of the pictures themselves will inform any studious observer the direction in which the light is allowed to enter.

By inserting this in your next, you will oblige yours, truly,
W. B. Parker.

[Our correspondent has either not seen the studios in question, or observed so imperfectly that his observations are not safe guides for others; and hence the necessity of our adding a note to his paper where we knew him to be in error as to a matter of fact. We must repeat it. In no sense is the principal light in the studios of M. Disderi, Mr. T. R. Williams, or Mr. Rejlander, front light. In M. Disderi's, where, by-the-bye, we recently stood for several negatives, there is not a vestige of direct front light, and very little top light, a high side light being the principal light. The studio of Mr. T. R. Williams admits of a principal front light, but as we explained in a recent number, he takes especial pains in his arrangements to avoid using such a light. Mr. Rejlander's principal light is a side and side-top light; the small amount of glass in front, even if it were used without blinds, bears no proportion whatever to the side light; but these small front windows are generally covered with blinds, having been placed in the studio, not for the purpose of obtaining direct light, but, as Mr. Rejlander phrased it, of aiding the reflected lights, when necessary. If our correspondent will refer to the description of Mr. Rejlander's studio, on page 109 of our last volume, he will see his error, both as to the direction of the light, and as to Colonel Stuart Wortley's being "precisely similar."

Our correspondent does not appear to have a very clear idea of the meaning of terms, when he contends that light coming from the side is front light. The terms describing lighting, as popularly used, have a clearly understood meaning. *Side light* is light from a window at the side of the room; *front light* is light from a window at the end of the room, directly opposite the background; *top light* is light from a window in the roof. In each case the light is necessarily in advance of the sitter, but the character of the picture is determined by the windows selected to admit the principal light. A direct front light is the worst. The best result is obtained from a combination of side and top light, which is that generally selected by painters, as the cast shadows in their works will show. Cast shadows are not often perceptible in photographs, but where does our correspondent expect to find the cast shadows from a direct front light?—Ed.]

Messrs. Helsby's Glass Room.

Dear Sir,—Will you kindly oblige me by inserting the following, taken from the description of Messrs. Helsby and Co.'s glass room, given in the *British Journal*, Oct. 1st, 1863, page 387, which I think will be a sufficient answer to their letter in last week's News. At the same time, if I have said anything derogatory to those gentlemen, I beg most sincerely to apologize:—

"One of the most prominent features, which at once strikes the visitor, is the entire absence of *curtains*, or other means of shutting off extraneous rays.

"The light and shade arrangement is effected by changing the position of the subject beneath the covered portion of the roof. Thus, any effect of shadow may be produced by causing the sitter to advance or recede, and by altering the position laterally at the same time.

"Messrs. Helsby and Co. are anxious that their views shall be promulgated for the guidance of their professional brethren."

I am, sir, yours, truly, W. B. Parker.
33, *Hunter Street, Brunswick Square.*

[We have before remarked how difficult it is to deal with this subject by mere description, it is so easy to misconceive or misunderstand. We understand the description quoted as simply meaning that by varying the part of the room in which the sitter is placed various effects of lighting may be produced. But the place of the sitter, in relation to the light, &c., would, of course, be decided *ab initio*, and there would be no necessity of dancing the sitter about in the harrassing manner held up to ridicule in Mr. Parker's paper. We do not, however, for a moment believe he meant anything offensive. It is merely another case in which he misconceives the meaning of terms.

Talk in the Studio.

Photography for Fac Simile.—The *Athenæum*, in a recent notice of a reproduction of the first folio of Shakspeare, remarks that the work would be valuable if an assurance existed that it was a perfectly literal and correct transcript of the original; but that printers are so liable to error in such matters, no such assurance can exist. They conclude:—"We see no way to a thoroughly safe reprint of the first folio, except through the photographic lens."

Punch's "Answers to Correspondents."—Punch has always evinced a great interest in photography. In a recent column of imaginary "Answers to Correspondents" he gives the following, which may interest our readers:—"Dejected" says she sent a carte de visite and stamps to one of the fellows who advertise that they will copy such things, and she has never been able to hear any more about carte or stamps. Shall we give her a note of introduction to the excellent secretary of the Asylum for Idiots?—"A Photographer."—The lady might not have been handsome, and might have been hard to please, but you were hardly justified in calling her a squinting old peacock with a sandy wig. We are quite sure that no such remarks are ever made by Mr. Watkins, Mr. Mayall, the Stereoscopics, or any other of the high class of photographers. Do you tout?"

Chromo-Photographs.—We have received from Col. Barratt a couple of specimens of his method of double toning, one on albumenized paper and one on plain paper. The subject is a group of two girls with landscape background; the arms and bosoms are undraped, giving ample scope for the illustration of the effect of the process on flesh tints. One of the girls is a brunette, and the hair and eyes are toned black, whilst the drapery is left brown; the other girl is a blonde, her hair, untoned, or toned very slightly, is a warm auburn, the drapery, a bluish black. The face, arms, &c., in each picture are left untoned and possess a delicate fleshy tint. Altogether, it is difficult at first sight to believe that the pictures are not tinted. Col. Barratt observes that by the employment of different toning solutions to vary the tint, he could produce a picture which few would distinguish from a water colour drawing.

The Great Beauty of Photographs.—Their great beauty is, that they provoke conversation. They furnish innumerable heads for discussion. If the cook happens to be late for dinner (and cooks generally are), they will find how

invaluable these "Heads of the People" are, and what agreeable reading they will supply to even the hungriest, as its illustrated pages present some new feature at every turn. Even an alderman would forget his appetite in devouring its contents. The amusement, too, is all the greater as it gives one an opportunity of criticising friends, not only to their faces, but behind their backs. A photographic album is the most amusing antepranclial friend that a lady could have in her establishment. In fact, no respectable drawing-room is complete without one, at the very least.—*Punch's Almanac.*

PORTRAITURE UNDER DIFFICULTIES.—Could a photographer take the portrait of a lawyer who went to him with a *fieri facias?—Ibid.*

To Correspondents.

G. A. B.—It is very probable that, with a little management, you might make the arrangement you propose as a substitute for a glass-house answer very well, especially if you use as much judgment and care as you have done in securing such good results hitherto in your "well." 2. We believe A to be a very good lens indeed. 3. We do not like acetate of soda or acetic acid in a negative bath: both are changeable and troublesome. 4. We have used methylated spirits in collodion for many years, without ever suffering any inconvenience. It is important to get it pure, and to that end it is wise to have that which has been redistilled, and is sold as absolute: it has a sp. gr. of about ·805, or thereabouts. 5. We do not think either of the lenses you propose as a substitute will be an improvement on the one you are using; both possess more curvature of field, and less depth of focus. The specimens enclosed are very good; the group is especially satisfactory.

JAVA.—The yellow paper is scarcely satisfactory when examined in the spectroscope, as, whilst it obstructs a great deal of light, it allows some of the actinic rays to pass through. 2. We are much pleased with the lantern slides. So far as we can judge by a hasty examination, they are very good and fine subjects. We will take an early opportunity of noticing them, and, if occasion serve, of exhibiting them in the lantern.

DENMARK.—It very often happens that we know nothing whatever of the private addresses of advertisers who desire communications for them to be left at our office. But we will make some enquiry as to the case in question.

J. R. WOOD, Massachusetts, U. S.—So far as we can judge from an examination of the plate, the result is very good. We will, however, get an impression taken at the press, and note further. We shall be glad to know your method of working.

J. H. S.—You are perfectly right; looseness and want of precision in the use of terms is the cause of much misunderstanding and perplexity. We endeavour to avoid this ourselves, but we can only check, not entirely prevent, it in others. 1. We should prefer more than ten feet for the greatest height for many reasons. 2. Where it is possible an angle of 45° is best for the pitch of the roof; such an angle admits more rays of light, without refraction or reflection, and also prevents the settlement and final admission of water during rainy weather. 3. White sheet glass is best, and the largest-sized squares you can conveniently use. 4. Let four feet be opaque at the sides, and six feet at the roof. There can be no objection, that we see, to adding the four feet all on one side.

H. T. B.—If you wish to secure the effect of an India tint on your prints by double printing, proceed as follows:—First decide the shape, say an oval; make a mask of black paper, covering the whole of your negative, except the oval aperture, the size required for the print. Arrange this between your sensitive paper and negative, and expose. You will thus get an oval print with white-paper margin. Now, take another mask, say square, the aperture about an inch larger than the size of the oval. Lay this over the print so as to leave uncovered the part to receive the tint. Cover over the oval printed part, and lay a plate of glass to keep the masks from moving; now expose to sun-light for a short time. When the whole is toned and finished the margin will, if properly managed, be a very good imitation of an india-paper. Mounts are prepared with an India tint ready for use. 2. We cannot, we regret, help you as regards wholesale houses who will take your prints. Your only plan is to write to some large publishers.

A SUBSCRIBER.—We can only recommend neutralizing and thoroughly sunning. If these steps fail, then nothing remains but to reduce the whole as chloride or carbonate. See our recent article on correcting disordered baths, or our ALMANAC just issued. 2. Try using half the quantity of citric acid in your intensifying solution. 3. So far as we know all are good; perhaps No. 1 best.

A. A.—We can only counsel using another sample of collodion intensifying more easily, or using a more powerful intensifying process. The use of a solution of iodine and iodide of potassium alternately with pyro and silver, will generally give any amount of intensity, or you may adopt Col. Stuart Wortley's method of using mercury and iodide and follow with pyro and silver. You will find full details of such methods in our ALMANAC just issued.

PUNJAB.—The meaning of the term *parts* in formulæ may be grains, drachms, ounces, or other quantities; but, whichever you use, must be employed throughout. In solids it means by weight, in liquids by measure, unless stated to the contrary. Thus, in the formulæ to which you refer, measured ounces or drachms, &c., of water, &c., must be used, and weighed ounces, drachms, &c., of tannin and other substances.

AMATEUR AND SUBSCRIBER.—Our YEAR-BOOK, just issued, contains a condensed account of all the new processes of the past year. Detailed accounts of them appear in our pages from time to time. There is no work which gives in a collected form complete working details of all new processes. There are various carbon processes; they all require considerable care and skill, and much experiment to work properly, as few of them have been described in detail. There is an account of a clever process by Mr. Blair on p. 485 of our last volume. There is no work devoted solely to the carbon processes in the English language. M. Poitevin's *Traité de l'Impression Photographique sans sels d'Argent* is the only work solely devoted to the subject.

W. T. T.—You will find an article on glass-houses in our YEAR-BOOK just issued. It seems probable that your sashes might be most readily rendered available for the glazed part of a studio like that designed by Mr. Matheson, three of the sashes for each side will give about 9 feet of glass in height and length, and 4 for the roof will give you 12 feet by 9 feet. Of course, a little contrivance would be necessary. Our time is so much occupied that we are compelled to decline personal correspondence on such subjects.

J. T. L.—An alkaline developer does not seem to afford any advantage with collodio-albumen plates. Nevertheless, by careful and suitable development the exposure may be very considerably shortened. The use of a hot solution of plain pyrogallic acid without silver or free acid of any kind will often give good results with short exposure. When all the detail is out, then the usual solution of pyrogallic acid, citric acid and nitrate of silver may be used until proper intensity is obtained.

B. B.—The presentation photo-electric engraving will be given with every copy of the number issued, without regard to subscribership.

ASPIRANT.—Under-exposure is the prevalent fault, and a little carelessness in manipulation. Be more careful to avoid stains. There is no need to sacrifice cleanliness and neatness in operating in your effort to secure artistic effects.

F. G.—No time has yet been announced for the next Photographic Exhibition, nor is the place yet decided, so far as we know.

N.—If a theodolite be used for measuring the angle, the centre of motion should of course be on the same plane as the ground-glass, and your diagram is incontestibly correct. We were supposing the use of a compass with divisions for degrees placed on the camera which was to be turned through an arc until the image of an object seen on the extreme right disappears on the left, and *vice versâ*. The axis of the compass should, in such case, be concentric with the optical centre of the lens.

JOHN ALEXANDER.—Your subscription is paid to No. 301.

MAJOR ANDREW HUNTER.—The amount received pays your subscription to No. 349, or about a year and a quarter. The postage is twopence.

C. BERTOLACCI's letter, and several correspondents in our next.

CONTRIBUTIONS TO THE "GODDARD TESTIMONIAL FUND."

	£	s.	d.
J. E. Mayall, Esq.	10	10	0
J. H. Dallmeyer, Esq.	10	10	0
Thomas Ross, Esq.	10	10	0
"The Photographic News"	5	5	0
"British Journal of Photography"	5	5	0
T. R. Williams, Esq.	5	5	0
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H. P. Robinson, Esq.	3	3	0
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J. Strongfellow	0	3	0
Mr. Evans	0	5	0
	£86	18	0

Photographs Registered during the Past Week.

MR. FRANK G. MORGAN, Petworth, Sussex,
Three Photographs of the Lord Lecoufield.
One Photograph of Rev. Charles Holland.
One Photograph of Rev. W. O. Purton.
One Photograph of the Hon. Miss Wyndham.

MR. SAMUEL HOGGARD, Middlesbro'-on-Tees,
Photograph—Group: Messrs. Bolckow and Vaughan.

MR. JAMES BURKE, 44, Lower Ormond Quay, Dublin,
Photograph entitled "Foreign Postage Stamps.
Photograph entitled "American Currency."
Photograph entitled "Madonnas of the Great Masters."

MR. JOHN PATRICK, 71, High Street, Leven,
Two Photographs of the Rev. George Gilfillan.
One Photograph of the Right Hon. J. Monerieff, Lord Advocate.

MR. MATTHEW BOAK, Driffield, York,
Photograph of Mr. William Eccleslield, on Horseback, Whip to the late R. Hill, Esq., of Thornton, near Pickering, York.

MR. H. F. NEWELL, Stonegate, York,
Photograph of Rev. S. G. Green, B.A.

MR. SAMUEL WALTERS, 3, Falkner Crescent, Bootle, near Liverpool,
Photograph—The Wreck of the "Royal Charter" in Moelfra Bay, October 26th, 1859.

MR. FREDERICK SNARY, 26, Castle Street, Bristol,
Two Photographs of Rev. Walter Henry Marriot.

MR. EDWARD APPS, 7, Upper Parade, Leamington,
Two Photographs of the Rev. Canon Jeffries.

MESSRS. LANCASTER AND CO., Grosvenor Street, Chester,
Two Photographs of the late Miss Bessey Goodwin.

MR. J. PINDER, Waterford,
Two Photographs of the Curraghmore Fox Hounds with the Huntsman and Whip.

It is necessary to remind some of our country friends of the arrangements made by our publisher for aiding them in effecting Registration. It is necessary that a form be filled up by the sender, and the sum of one shilling and threepence for each picture to be registered.

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 279.—*January* 8, 1864.

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LIGHTING THE SITTER.

In all discussions, it is a point of vital importance to begin by defining terms; but there are some terms so simple, clear, and precise in themselves, and so well understood in their popular meaning, that until some singular perversion of that meaning is met with, few people would dream of the need of definitions. From a recent discussion at the South London Photographic Society, and from a letter which has since appeared in our columns, it appears that the meaning of such simple words as *side*, *front*, and *top*, when used in relation to lighting, are liable to be misunderstood, and to convey totally different meanings to the minds of different persons. We do not believe that misconception on the subject is at all common or prevalent, but the fact that it exists in one or two instances suggests the possibility of other cases, and renders a few explanatory words on the subject desirable. At the same time, we feel it necessary to apologise to many of our readers for "plentifully declaring the thing as it is," and attempting to make clear what "is plain as way to parish church."

An ordinary glass room may have three distinct sources or means of admitting light: *side* light, *top* light, and *front* light. By the *side* light is meant a window at the side of the room at right angles with the back ground; by the *top* light is meant a sky-light or window in the roof; and by the *front* light, a window directly opposite the background, and at right angles with the side light. We believe the terms are popularly understood to convey the general meaning we have just stated. It is clear that the terms must be so understood, for if their meaning is more restricted, then a side light can only mean a strip of window exactly the height of the sitter, and about one foot in breadth, exactly opposite his side; a top light must mean an aperture less than a foot in diameter immediately overhead; and a front light a strip of nearly similar dimensions to the side light directly in front. Such a meaning is clearly absurd, and untenable for a single moment. No one ever applied such light, no one ever dreamed of it; but such a meaning to the terms is inevitable, if our first definitions be not correct. On the other hand it is equally clear that all light in all photographic studios—at least, all we have ever seen or heard of—enters in advance of the sitter, reaching him from various angles. From this it has been argued that because the light enters from various points in advance of the sitter, that it is front light. By a parity of reasoning, all the light from a window in front of the sitter at each side of a strip of about eighteen inches, directly opposite to him in a right line, would be called side light, and so on in the same manner with top light. One simple change in the terms will, however, make the whole matter clear. If, instead of speaking of side light, top light, and front light, we say side-window light, top-window light, and front-window light, the whole matter becomes definite and clear. For the photographer really uses the term light, qualified with the various prefixes, to indicate the position of the window through which the light is admitted. Strictly speaking, all light is from above, *lux venit ab alto*, but the position of the window indicates in a general manner, the direction in which it shall reach the sitter.

But the truth is, the art of lighting the sitter depends very little, after all, on familiarity with cant terms, whether they are clear or abstruse. The thing of chief importance is, that the photographer should know the effects he desires to get, and be able to perceive when his model is properly lighted, without waiting to see the effect in his photograph. With a high side light or front light, especially if it do not reach the ground, the effect of a top light may be obtained. With a wide top light, and careful use of blinds, the effect of a side light may be obtained. By varying the position of the sitter, a side light may be converted into a partial front light, and a front light into a partial side light. Different models will require different treatment; artistic taste and judgment alone can guide the photographer in the precise management of light, so as to secure with the especial arrangement of his studio the best result with every type of sitter.

Without entering into a detailed consideration of the subject of lighting under various circumstances, we may again briefly refer to a few fundamental principles for general application. The object of the portraitist is twofold: he wishes to secure a portrait which shall be at once striking and pleasing as a likeness, and at the same time artistic and satisfactory as a picture. To secure the former condition, simplicity of light and shadow is desirable, and that arrangement of them most familiar to the friends of the sitter. Unusual or unexpected effects of lighting are often very effective and striking in art studies, and may be made to add much poetry of feeling to a picture; but they are rarely available for the general business of portraiture, as interfering materially with the likeness, which should be familiar to be striking. It is important to consider which of the three main lights to which we have referred, or what combination of them shall prevail, to secure the most satisfactory compliance with the two objects of the portraitist—*likeness* and *pictorial effect*.

A direct side light is undesirable, because it cuts the picture up into two masses of chalky light and black shadow with little gradation. Moreover, it falls upon and illuminates the entire side of the face, the back part as well as the front, whereas retiring surfaces should fall into half tint or shadow. Nevertheless, a side light, to a certain extent predominant, is desirable because it is a familiar mode of lighting in actual life; persons are most frequently seen by

their friends illuminated with a side light from the window of an ordinary sitting room; and because it is conducive to breadth and force of pictorial effect.

A direct front light is undesirable, because it gives flat, tame pictures, and therefore never striking or pleasing as likenesses. Unless the picture be, from the nature of the subject, the chemical conditions, or the vigorous printing, very strongly marked, it is generally destitute of modelling, and tends to give the face a broad, flat effect. Moreover, the eyes being directed to the light, are, if light in colour, made still lighter, and the pupil being contracted by light, materially aids in giving a feeble, fishy, spiritless effect. It tends also to give an equal monotonous effect of light and shadow, destructive of breadth, which requires balance of light and shadow, not uniformity. We may here, with propriety, extract a few pertinent words from Frank Howard's "Sketcher's Manual" on the subject:—

"The light should never be directly in front of the picture, or object chosen for the picture; that is to say, coming over the head of the spectator from behind him. If the subject be a flat object, such as the sides of a tower, it will prevent a mass of equal light, or a spot. If the object approach the circular form, as a round tower or tree, the light will graduate equally from the centre to the two equally dark sides. The outline of the two sides of the tower, and throughout of the tree, will be of uniform degrees of dark, and all pictorial effect in danger of being lost."

A direct top light is undesirable, because the result is unnatural and unpleasing. The effect so familiar and so unsatisfactory in photography is produced; the top of the head adorned with glossy black locks appears grey; the eyes are deep, dark caverns; black shadows rest on the lips and neck; the muscles of expression at the corner of the mouth cast a black shadow underneath, which seems to darken the scowling effect already produced by the cavernous eyes. The likeness is harsh, and the picture is heavy.

Of course there are circumstances in which either of these modes of lighting are successful. A direct side light, or a direct top light, may aid in giving force to a feeble face, or a direct front light gives softness to a harsh rugose face with deep line and sunken eyes. But we have been referring to usual, not exceptional, cases.

Whatever the form of studio, then, in order to secure the most familiar likeness, and the most pleasing picture, a combination of side and top light is desirable. Direct front light, or a front window, should be avoided, as spoiling the eyes in the picture; and sufficient front light effect may be obtained from the side and top windows. The side light should first reach the sitter at an angle in advance of about 20°, and extend forward for about 45° or 50°. By this arrangement neither direct side or front light reach the sitter, at least 20° in each direction being cut off, direct light from the two points forming, of course an angle of 90°. The top light should reach the sitter at an angle of not less than 45° to the zenith, and extending to 70° or 80° in front, and to the side joining the side light, so as to form one unbroken source of light: and the fewer sash bars or divisions the better. In a studio where top light is inconvenient to obtain, a high side light may be made to fulfil many of the required conditions. For instance, if the studio have a side light twelve feet high, the light will reach the head of a sitter placed at six feet distance at an angle of 45°, and upwards. If a side light be inconvenient, a wide top light may be made to serve in place of a side light. With a roof twelve feet high, a blind extending twelve feet over head will allow the light to reach the head of the sitter at an angle of 45° and upwards, from any direction, front or side.

In all the cases to which we have referred, the more direct and concentrated the light, the more forcible the picture; the more spread and diffused the light, the softer the picture. It must be borne in mind that we have had regard chiefly, in the previous remarks, to the usual phases of portraiture, in which the face is taken in various modifications of the three-quarter and front face, the light varying, now more the side, and now more to the front, according to the position and character of the head; but falling generally on the advancing side of the forehead, nose, cheek, &c., the retiring features being in shadow, which must be rendered delicate and transparent by reflected lights. Especial modes of lighting may be adopted to secure special effects. For instance, a profile is best treated with the light somewhat behind the head, or coming at a similar angle from the back and side, as that described comes from the front and side. More relief and modelling, and a more spirited effect in the eye is thus obtained, than if the profile were illuminated with any approach to front light.

We have said nothing about the mode of securing reflected lights, nor to what extent a subdued light through blinds from the opposite side, or from the front, may serve the place of reflections. Of course no photographer will dream of using an equal light at each side at the same time, as all modelling must be destroyed by conflicting lights of equal strength.

A little observation of the works of great masters will enable the intelligent photographer to perceive the modes of lighting employed, by the direction in which the shadows are cast. It will be seen that in the mass of good portraits, the figure is lighted on principles very similar to those we have described, and that the most satisfactory effect is thus produced.

We conclude by repeating a remark we have often made, that whilst general principles for lighting may be stated, definite rules to suit all circumstances cannot be laid down. The subject requires study and observation. If the photographer once masters general principles, he will soon learn to apply and modify them to varying circumstances, and will not be misled by the misuse of terms, or by erroneous descriptions.

THE ALLEGED EARLY PHOTOGRAPHS.

As the evidence accumulates, and the discussion advances, the subject seems in no wise nearer to a settlement. We appear to get more and more into the region of hearsay and conjecture; as the evidence becomes more voluminous it seems to be more doubtful. Some of the claims for an earlier date than is commonly assigned to photography appear to be demolished, and fresh claims are raised. At a meeting of the Photographic Society, on Tuesday evening last, the subject was again discussed, and some new facts and opinions brought forward. Mr. Smith was, unfortunately, not able to attend, so that the question lacked some of the evidence which he could have laid before the meeting, and its final discussion was postponed to a subsequent period.

Meanwhile, we will briefly indicate what was done. Dr. Diamond produced an early print, by Mr. Fox Talbot, which, if not from the same negative as the breakfast-table print exhibited at a former meeting, as the work of Thomas Wedgwood, in 1792, at least represented the same subject, and Mr. Malone produced a similar print taken twenty years ago by Mr. Fox Talbot. The evidence here seemed to set aside entirely the idea that the alleged Wedgwood print was other than one of Mr. Talbot's early photographs. Dr. Diamond had also consulted Mr. Robert Hunt, as a gentleman very familiar with the early history of photography. He was inclined to think, for several reasons which he stated, that the paper pictures were not photographs; that the metal pictures were so there was no doubt, and, probably, by a process with a resin similar to that used by Niepce, during 1814 and 1828. Dr. Diamond further read a letter, and part of a pamphlet, by a grandson of Matthew Boulton, which, whilst expressing a conviction that the secret process of copying pictures practised at Soho, was probably by the agency of light, cautioned members against attaching too much importance to the statements of Mr. Price, from whom much of the evidence adduced by Mr. Smith had been procured, on the ground that "accuracy was not Mr. Price's forte."

Furthermore, respecting the metal pictures, the opinion of a manufacturer of copper-plates had been taken, who gave it as his opinion that the plates on which these pictures were taken were manufactured about twenty-four years ago.

On the other hand, Dr. Diamond read a letter from Mr. Fairholt, whom he had consulted as an expert in matters pertaining to drawing and engraving. He expressed a conviction that the paper-pictures were not produced by any kind of hand labour, and had the monochromes been submitted to him for examination, without any evidence, he should have been disposed to pronounce them to be some kind of photographs. Mr. Shadbolt had also a theory based on electrical analogies to offer, as to the mode in which such pictures had been produced. He suggested that a glass or other plate, having a camera image projected upon it, might have certain electrical conditions induced, so that being submitted to the fumes of carbon—smoke in fact—a deposit in the gradations of the image might be produced on the plate, and from thence transferred to prepared paper. This theory is very ingenious, and has the sanction for its possibility of, perhaps, the highest living authority on electricity, to whom the theory had been submitted. We regret that Mr. Shadbolt was not at liberty to publish this gentleman's name, but as he communicated it to us in confidence, we can assure our readers that there is no physicist or electrician higher living than the authority whom he had consulted. The theory, however, may be easily verified by experiment; at present it remains to be ascertained that the action of light is of an electrical character.

The new claim to which we referred is this:—Mr. Shadbolt produced a paper negative similar to a calotype negative, which had been sent to him from Edinburgh, by Mr. Taylor. It was stated to have been taken twenty-eight or twenty-nine years ago, which was about five years before the publication of the discovery of Talbot or Daguerre. Mr. Greenwood added that the photograph had been in the family twenty-nine years, and the house, of which it was a view, had been altered twenty-nine years ago. He was not at liberty to mention the name of the family. This is another startling claim, which must, of course, wait for further evidence.

A variety of minor interesting facts connected with the subject were brought forward and discussed at the meeting, for which we refer our readers to the report on another page, and to the documents themselves, which we shall publish next week. We now only give a general view of the main new facts of importance brought forward. The pamphlet to which we have referred is issued for private circulation, we believe, by M. P. W. Boulton, and is entitled "Remarks on some Evidence recently communicated to the Photographic Society." As we published the evidence in question, we now append an extract from the pamphlet, setting forth Mr. Boulton's comments on the matter. After expressing regret that the subject had not been brought under his notice at an earlier date, and remarking that although Mr. Price, from whom much of the evidence had been derived, was "a useful and intelligent servant," that he was not always accurate, and was "liable to great misapprehension." He proceeds:—

"The time of clearing out the library is dated by him too far back. This is stated to have taken place twenty years ago; whereas, it was certainly not earlier than 1847 (probably in 1848).

"Miss Wilkinson is represented as giving away the camera as 'rubbish;' from which the natural inference is, that she was ignorant of the use of a camera, and did not know one by sight; whereas, she frequently used the camera, and well knew its nature. I have been informed by a lady, a friend of the family, that she remembers seeing Miss Wilkinson taking what she called 'sun pictures' on the lawn in front of Soho House, at a time, to the best of her belief, twenty-eight years ago; and Mr. Smith has obtained evidence purporting to show that Miss Wilkinson used the camera for photographic purposes at a still earlier period.

"It is stated that the library in which the supposed photographs were found remained unopened for fifty years, and was then opened by Price himself. This representation of the case is by no means accurate. The library in question was not hermetically sealed. The room itself was in constant use, and the books freely accessible. The cupboards were rarely opened, but were so occasionally; and I do not myself doubt that Miss Wilkinson had access to the cupboard in which the camera, mentioned in the evidence, was kept and made use of that very camera in her photographic experiments.

"The antiquity therefore of the articles under consideration must be substantiated on grounds wholly independent of the statement which represents the library as unopened or undisturbed for fifty years.

"And I think that the antiquity of the *paper pictures* readily admits of substantiation quite independently of any such statement. It is confidently affirmed by good judges that they differ from the products of any known process; there seems therefore no reasonable ground to doubt that these peculiar pictures are specimens of the peculiar process which was carried on at Soho in my grandfather's time, and not at any subsequent period. As exhibiting the early stage of this process, they are of great interest; and I consider that my best thanks are due to Mr. Smith for having brought them to light, as also for the zeal and industry evinced by him generally in connection with the subject.

"It appears, on good evidence, that the pictures made at Soho by the secret method practised there, were produced in some way by the agency of light; at the same time the circumstance that only pictures and engravings appear to have been copied by this method, and the large size of the pictures produced by it,* render it difficult to believe that it consisted in either copying or fixing the image formed by a camera.

"With respect to the metal plates, I do not think their antiquity can be regarded as established till further evidence corroborative of Mr. Price's statements can be obtained.

"The improbability of the alleged fact is, however, not so great as might appear at first sight. Seeing that the process, of which the paper pictures are specimens, had been carefully suppressed as objectionable, it can be understood that the photographs on the metal plates might have been taken at Soho at the date assigned, and yet that the method of their production might not have been divulged or pursued."

PURE IODIDE OF SILVER SENSITIVE TO LIGHT.

BY JOHN SPILLER, F.C.S.

WHILST engaged a short time since in some experiments upon the action of light upon the iodide of silver, I was led to the observation of a new condition under which the colour of the pure precipitated iodide becomes subject to alteration by exposure to sunlight. It is well known that when solutions of iodide of potassium and nitrate of silver are mixed, the former being in slight excess, a pale yellow precipitate is obtained, which, after washing, consists of iodide of silver in a condition under which it remains unaffected by prolonged exposure to light. The Hon. H. Fox Talbot first showed how it became possible to alter these circumstances by placing in contact with the inert iodide a small proportion of nitrate of silver; and M. A. Poitevin has recently made the important discovery that sensitiveness may be imparted to the iodide of silver by combining therewith tannin, gallic acid, or certain other reducing agents of the same class.

The authors of standard works on chemical science do not agree in their descriptions of the pure iodide of silver; the majority treat of it as a compound which does not undergo any alteration in colour by exposure to light, and this supposition is not disturbed by the recent researches

* I have some oil copies made by this process much larger than those exhibited by Mr. Smith.

of MM. Gaudin and Hermann Vogel, who have respectively by their writings added greatly to our knowledge of the properties of the iodide and bromide of silver. It appears, however, that whilst the influence of extraneous chemical agents has been thus diligently studied, no account has been taken of the changes in physical condition which are induced by the action of heat. Knowing how greatly the physical properties of the iodide of mercury may be changed by exposure to heat, amounting to a conversion of the scarlet iodide into a brilliant yellow modification of the same body, it occurred to me that possibly the iodide of silver might suffer a molecular change of the same character, although not in so great a degree. Experiment has confirmed this hypothesis, and I am now in a position to assert that by the application of heat alone the indifferent yellow iodide becomes changed in properties, so as afterwards to darken on exposure to sunshine much in the same way as the ordinary modification of the bromide of silver. There is not any permanent alteration in colour brought about as the direct result of heating the iodide of silver, at the most it can only be said to lose in a trifling degree the brilliancy of its yellow colour, verging a little towards grey. I have reason to believe that the particles contract somewhat in volume and become more dense than before, judging by the very marked indications of contraction which precede the actual fusion of the yellow particles at the highest temperature which has been made the subject of experiment. The physical change at this point is so very palpable, by the conversion of the opaque substance into a dark-red fluid, which, on cooling, solidifies to a semi-transparent mass of pale yellow colour, that we are not surprised to find the product after fusion quickly affected by exposure to light. In determining the degree of temperature which affords the means of converting the ordinary inert iodide into a sensitive compound, I have arrived at the conclusion that 350° Fahrenheit is the lowest practical limit; and if the heat be augmented to 400° and upwards, the change is more rapidly effected. It has thus been possible to test the truth of this observation by submitting the simple iodide of silver paper of Fox Talbot to the action of this degree of temperature in a hot-air chamber, and then to look for an alteration in colour on merely exposing the yellow paper to the light. This was done, and the result duly confirmed the previous conclusions. It must be admitted, however, that such a process could not be practically applied, on account of the change being but slight, and the texture of the paper suffering greatly by this exposure to heat.* Another mode of preparing the yellow iodide of silver was adopted, viz., that of acting upon silver leaf with iodide vapour: the product was not changed in colour by exposure to sunshine until it had been heated to the degree already named. I may state, in conclusion, that several other points, having reference both to the iodide and bromide of silver, have been already partially worked out; but the publication of these experiments must be deferred until a more favourable season permits of corroborating some of the results arrived at.

Addendum.

I take this opportunity of correcting an erroneous statement attributed to me by M. Vogel, in his recent papers "On the Theory of Photography." He controverts an opinion which I never expressed, viz.:—that I had deduced the metallic nature of the product obtained by the action of light upon the chloride of silver, from a consideration of its high *specific gravity*—a property not once referred to in my papers on "The Composition of the Photographic Image,"† which stand correctly printed in the English journals. The discrepancy must be accounted for by want of care in abstracting or translating; and it is to be regretted that the German chemist should have drawn his information from an American source (*Humphrey's Journal*), instead of the original text, which was to be found in the same language.

Chemical Department, Royal Arsenal, Woolwich,
January 2, 1864.

* The practice of "sunning" the Talbotype paper before sensitizing it with the gallo-nitrate of silver was, I remember, resorted to many years ago by Messrs. Henneman and Malone, as an expedient calculated to confer greater rapidity in the subsequent stages of the process. Can the action of the sun's heat-rays be competent to effect an alteration in the molecular condition of the iodide of silver?

† *Philosophical Magazine*, March, 1860.

Scientific Gossip.

Easy Production of Oxygen Gas—Combustion of Iron in Compressed Oxygen.

In the production of artificial light of great intensity, photographers have been frequently recommended to employ oxygen gas, the light being obtained by the introduction of a jet of this gas up the centre of an Argand, oil, or gas lamp, or, by burning it with hydrogen in a blowpipe form, and allowing the jet to impinge upon a piece of lime or magnesia. A jet of oxygen is also occasionally used in conjunction with a spirit-flame, the gas being driven in a fine stream through the ignited vapour into the lime or magnesia; and other applications of oxygen have been suggested from time to time, and will be found duly recorded in these columns. The gas itself is the one thing needful in all these suggested methods of obtaining light, and being somewhat difficult to prepare, and expensive for amateurs, by reason of the liability to breakage of the apparatus employed, if not on account of the actual cost of the materials used, any means by which its production in small quantities can be readily effected, will be looked upon as a boon to a large circle of would-be experimentalists. Although our main object in calling attention to a very rapid and convenient means for procuring pure oxygen lately brought forward, is to place our readers in possession of information which will, doubtless, be doubly welcome at this season of the year, it may be of some interest to them to know that other professions are also anxiously awaiting the advent of cheap oxygen. There is no doubt that this gas would prove of the very highest service in many cases of disease, and we have already heard of some marvellous cures which have been effected by inhaling it, under proper medical superintendence. The experiment of dipping a glowing match into oxygen is known to everybody. The feeble spark which the diluted atmospheric oxygen is insufficient to sustain, instantly bursts into splendid and brilliant combustion when fed with the pure gas, and the result may be looked upon as a type of the wonderful restorative action of oxygen upon the feeble spark of life, when fanned by the inhalation of this potent vitalizer.

The ordinary methods of preparing oxygen are very inconvenient, when the operator has not the conveniences and resources of a chemical laboratory; and it has long been a desideratum to obtain some plan by which oxygen could be rapidly evolved in the wet way, like hydrogen and carbonic acid. This want has just been supplied by Mr. Robbins. Under the name of oxy-genesis, he has introduced a mixture for the instantaneous production of pure oxygen gas, with as much facility as carbonic acid is obtained from marble. All that is required is to introduce some of the powder into a common Woulf's bottle, one neck of which is connected with a delivery tube, whilst the other contains a funnel passing through a cork. When oxygen is wanted, all that is necessary is to pour dilute sulphuric acid down the funnel tube, and the evolution of gas will commence, and will proceed either rapidly or slowly, according to the dilution of the acid and the quantity employed. One pound of the powder will yield in this way about five gallons of oxygen: and although the expense of preparing this amount of gas in the manner above described is decidedly greater than when it is generated from chlorate of potash by the ordinary laboratory process, yet, when we take into consideration its neatness and absence of mess, we have no doubt that most amateurs would prefer paying a little

extra for the convenience and rapidity of manipulation. We wish we could make this notice complete by giving full details of the preparation of the mixture; but it having been mentioned to us in confidence, we must refrain from doing so at present.

Whilst we are writing about oxygen, we may mention a very curious circumstance which has lately been brought before the notice of chemists, by Dr. Frankland. He has been lately engaged in experiments requiring the employment of highly compressed oxygen, and for this purpose he used the apparatus for the compression of gases made by Natterer. During the employment of this apparatus an accident happened which fortunately occasioned no serious disaster, but was the means of indicating a result which was not likely to have been anticipated. The apparatus consists of two parts. On the one hand is a powerful compression pump, worked by a crank and fly-wheel, which forces the oxygen into the other part, consisting of a strong cast iron receiver, fitted with a conical screw plug, and other joints and connections of steel. The action of the pump had been maintained until 25 atmospheres of oxygen had been accumulated within the receiver, when suddenly this latter part of the apparatus exploded, at the same time diffusing a shower of sparks, reminding one of the phenomenon observed when iron or watch spring is burnt in oxygen. On examining the shattered fragments of the iron receiver it was manifest that this result had indeed happened, and it appeared that the combustion of iron was possible under the circumstances, a small quantity of oil used as a lubricant becoming no doubt in the first instance ignited, and then imparting combustion to the iron. The whole interior surface of the iron receiver was blistered and coated with fused globules of magnetic oxide of iron, the small tubular apertures through the screw plug were widened to fourfold dimensions, and no less than half an inch of steel was burnt of the massive head of the apparatus. It was perhaps so far fortunate, that a defective joint rendered it impossible to obtain more than the pressure of twenty-five atmospheres, under which the apparatus exploded, for had it been augmented to forty atmospheres, the iron must have taken fire more readily, and perhaps have been completely consumed or hurled about as white hot bolts, endangering both life and property. Dr. Frankland, by a rough calculation, arrived at the conclusion that the heat developed by the union of half the contained oxygen with the iron would have been sufficient to melt the cylinder; the molten metal of which would then have been thrown about by the remaining pressure of the other half of the gas. The same apparatus had been employed a few days before under a much greater degree of pressure; in all cases the pump had been worked very slowly, but it had been noticed that more heat was evolved in the compression of oxygen than of carbonic acid. The reason was now apparent; the spray of oil forced in from the pump must be very inflammable in an atmosphere of compressed oxygen, and would act like tinder in inducing the combustion of the iron. The weak point in an apparatus of this sort is the lubricant. Instead of olive oil a good non-combustible, or difficultly-combustible substance, should be used. Silicate of soda, paraffin, soft soap, or glycerine, have been suggested, and there is little doubt that the employment of one of these, more particularly the latter, would remove the great source of danger.

Among the many suggestions which have been made for employing oxygen gas for photographic or photogenic purposes, that of preparing it highly condensed, and then selling it in strong receivers under a pressure of 15 or 20 atmospheres, has more than once been made. If this plan is ever carried out, manufacturers would do well to avail themselves of Dr. Frankland's experience, as here recorded.

Developing Tannin Plates with Iron.—If after exposure a tannin plate be soaked for a short time in distilled water, and well washed to remove the tannin, it may then be developed with a solution of proto-sulphate of iron.

DOUBLE PRINTING.

BY R. HARMER.

I can endorse the "Hints on Double Printing," in the News of 18th December, as to the method of obtaining different tones by exposure to sunshine or diffused light; but there is another method which I find is far more effective, and gives a better tint: viz. after the free nitrate is removed by washing, dry the proof, and place it again in the frame, and print the tint; this method will be found to produce a tint of uniform colour, distinct in tone from the subject, but in harmony with it. I am pleased to hear that this style of printing is gradually coming into use; but I may, perhaps, be allowed to say that the few specimens I have seen have been much overdone—the depth of the tint being obtrusive instead of retiring. It appears to me, when this is the case, all delicacy and artistic feeling are lost. Those using this style of printing, cannot have a better guide for effect than a fine line engraving on india-paper.

POSITIVE PRINTING WITH PEROXALATE OF IRON.

BY DR. D. VAN MONCKHOVEN.

Dissolve in 1 litre (35½ oz.) of water, 300 grammes (11 oz.) of peroxalate of iron and ammonia, filter the solution and keep it in a dark place, for it rapidly decomposes in the light. Select some paper sized with gelatine, an English positive paper answers best. Employ the smooth side, and mark the back with a pencil.

Pour the solution of peroxalate of iron and ammonia into a porcelain dish, float the paper upon it during four minutes, and suspend it in a dark place to dry.

The peroxalate solution will serve until it is exhausted, and the paper imbued with this salt will keep for an indefinite time, if sheltered from the action of light.

The exposure of this paper under a negative in the printing frame will vary from four to eight minutes, according to the strength of the negative, and the intensity of the sun's light. The picture is slightly visible upon removing the paper from the printing frame. The paper when covered with the peroxalate is of a very pale rust yellow colour, and the picture appears *negative* upon it, for the action of light whitens the yellow tint in the paper. We proceed immediately to the following operation.

Extend the proof upon a sheet of bibulous paper, and moisten a tuft of cotton in a 5 per cent. solution of nitrate of silver. Rub this tuft upon the paper in the direction of its greatest length, operating rapidly. A soft pencil may be substituted for a tuft of cotton. The light, acting upon the paper, decomposes the peroxalate of iron, converting it into proto-oxalate. The first will not reduce nitrate of silver, but the second eliminates metallic silver from the nitrate. The picture appears immediately, and if the exposure to light has been well timed, is of a very beautiful purple colour.

If the nitrate of silver has not acted upon the sizing of the paper, it is only necessary to rinse the picture in order to fix it. But the nitrate combines with the sizing of the paper, and if we limit ourselves to a single washing, the paper will eventually assume a grey tint, even in the whites. We therefore leave the paper for ten minutes in an aqueous solution of sulpho-cyanide of potassium, of the strength of 10 per cent., to which solution we previously add $\frac{1}{150}$th part of the double chloride of gold and potassium. The sulpho-cyanide fixes the picture by dissolving the argentico-organic combination, and tones it at the same time, the chloride of gold acting precisely as in ordinary toning.

Finally, the proof is washed in two or three waters, but these washings need not be nearly so abundant as those required by a fixing in hyposulphite.

Instead of developing with nitrate of silver, we can also employ chloride of gold: in this case the picture is violet, and requires only a simple washing to fix it.

Preparation of Peroxalate of Iron and Ammonia.—Take some sulphate of iron in crystals as large as a pea, and pour on them a little nitric acid. The sulphate is dissolved, disengaging acrid fumes. A gentle heat favours the reaction. Sufficient acid must be added to convert the crystals of sulphate of iron into a yellow liquid, but not in excess.

Dilute the liquid with water, and then you have a solutioz of per-sulphate of iron. Filter it, and add a warm solution of hydrated oxide of barium, taking care to leave an excess of salt of iron. A red powder is precipitated, which is a mixture of per-oxide of iron and sulphate of barytes. If we employ soda or potassa, the peroxide precipitated always retains these alkalies, notwithstanding the subsequent washings.

Wash the precipitate, and leave it to settle in a large glass vessel, and decant the clear liquid seven or eight times. Finally, after decanting it for the last time, transfer the precipitate into a porcelain capsule, heat it, and add by fragments some bi-oxalate of ammonia. Insensibly the precipitate loses its colour, becoming white. Filter it, and throw away the sulphate of baryta after pressing it. The bi-oxalate of ammonia has dissolved the peroxide of iron, and this is converted into peroxalate of iron and ammonia. Evaporate it and leave it to crystallize.

In the light this solution disengages carbonic acid, and is decomposed: the operation must therefore be performed in the dark.—*Bulletin Belge de la Photographie.*

DRY COLLODION.

BY M. BLANQUART EVRARD.

BEFORE entering upon this subject we must pay our tribute of admiration to M. Taupenot, Major Russell, and others, whose valuable labours enable us to employ collodion in the dry state, by the aid of adjuncts which preserve the film from the corrosive action of the nitrate of silver remaining free on its surface, or in the pores of its tissue. If we were engaged only in the improvement of the proofs obtained by the methods of preserving, we should be silent as to our own researches for obtaining dry collodion, properly so called, but we think that preserving is not the final solution, but that it is the *elimination* of the injurious principle which ought to be our aim to attain, and the logical basis of true progress. We have, therefore, left to others the search after perfect results by preserving agents, in order to arrive, like our worthy friend M. Alphonse de Brebisson, at the discovery of an instantaneous preserved collodion.

The problem we sought to solve was the following:—To remove chemically from the sensitized collodion film all the silver salt remaining free on its surface and in its pores, without altering the homogenity and photogenic qualities of this film after it is completely dried. We found the solution of this problem in treating a sensitized collodion film by the developing solution, as is done after the film has been exposed in the camera. In an appendix to our *mémoire* of the 6th of February last, we made this result known, and time and experience have since completely confirmed it.

Thus, we have ascertained—

1st. That every collodion that will yield a good negative in its wet state is apt to give a good one also in the dry state, without its being necessary to change anything in its composition, or in the sensitizing bath.

2nd. That dry plates kept in a box, protected from light and moisture, maintain all their good qualities. Plates prepared, some during last winter, others during the greatest summer heat, differ in no respect at the present time from those prepared only a week ago.

We now proceed to point out the conditions necessary to be observed in order to ensure success.

1st. To take every precaution observed in ordinary photography with still greater care. Bad results produced by unequal thickness of the collodion film, badly cleaned plates, &c., &c., tell in this case with much greater force than in the wet process. It will be prudent to reject every plate that has been employed before, as it often reveals the existence of former reductions of silver which it is impossible to suspect beforehand.

2nd. Do not submit the collodioned plate to the silver bath until the collodion is well set: nor withdraw it from the bath until all greasiness of surface has disappeared. The same precaution is recommended to be observed in the washings where this greasy appearance shows itself.

3rd. Employ rain-water only for the first washings, and distilled water for the last; then leave the plate to dry spontaneously: in the evening, or on the morrow, complete the drying by artificial heat, but not luminous: a clear fire or a spirit lamp will fog the pictures: do not attempt to preserve the plates until they are quite dry. Every plate unequally dried will yield an unequal picture upon exposure. To develop the picture, the developing solutions must not be applied until after the collodion film has been uniformly softened in a water bath; first pour on the developer, then the silver bath, so that there be no break in the flow, and that the liquids well cover the entire surface of the plate. If this care be not taken, and if the solutions abrade the latent picture, it will certainly be marbled. Especial care must be taken upon commencing the development not to mix the developer with the silver bath; every mixture of these two bodies gives rise instantly to a reduction which covers the surface of the film.

We must begin by pouring on the developer, then the solution of silver, which, upon contact with the developer, slowly deposits upon the parts acted upon by light the metallic precipitate which constitutes the picture. This memoir is accompanied by some specimens, which show:—

1st. That notwithstanding its absolute desiccation, and the tenuity which results from it, the film of collodion retains all its sharpness and delicacy, without the usual hardness of albumen in the dry state.

2nd. That, contrary to what might have been feared, the reductions of silver have come very rich, so as to be very easily developed by light, orin gradations of intensity by means of the fumes of iodine, as indicated in our *mémoire* upon the intervention of art in photography.

We now proceed to point out the method we follow to obtain the accompanying pictures.

The collodion must not be old; we say this distinctly, because it has been said that an old collodion is required for pictures on dry collodion. This collodion was made of—

Ordinary collodion	1,000 parts.
Iodide of cadmium	7 ,,
Bromide of cadmium	3 ,,
Iodide of ammonium	2 ,,

The sensitizing bath—

Nitrate of silver, fused	8 parts.
Nitrate of silver, dried	2 ,,
Distilled water	100 ,,

And a few drops of collodion.

The plate, upon removal from the silver bath, was placed during at least ten minutes in a dish of water, acidulated with 5 per cent. of acetic acid.

The solution, which was next poured upon the plate, consisted of the double sulphate of iron and ammonia, proposed by M. Meynier, in the following proportions:—

Sulphate of iron	10 parts.
Acetic acid	40 ,,
Alcohol	20 ,,
Distilled water	1,000 ,,

The first dose being poured off, a second is applied; the plate is then washed in abundance of water.

For greater precaution, and in fear that some drops of nitrate of silver on the back of the plate may reach the collodion, it has been covered with the developing solution.*

* If this sulphate of iron, collected and next day examined, does not appear to contain reduced silver, we may reckon upon the plates keeping well, the other preparations having been properly performed.

Another washing in plenty of water, concluding with a jet of distilled water, acidulated with 5 per cent. of crystallizable acetic acid.

Spontaneous drying, followed next day with absolute drying at a gentle covered fire.

Exposure in the camera obscura.

After exposure, the plate is placed for ten minutes in water, to soften the collodion film equally. Upon removal from the water it is covered with the sulphate of iron solution indicated above.

The developer is afterwards kept moving over the plate for a minute at least, without any signs of a picture appearing (this shows the absence of free nitrate of silver); a portion of the developer being poured off, we then pour on a solution of fused nitrate of silver, strength 3 per cent., with 5 per cent. of acetic acid, and a few drops of alcohol added to it to make it spread uniformly over the film. The first signs of a picture now make their appearance. A little of the sulphate of iron is added anew, to obtain a more abundant reduction, and to bring the picture to its complete development.

We conclude this paper by repeating that, in our opinion, true perfection consists in simplifying processes, and we invite all experimental photographers to pursue this aim. We see no reason why we should not succeed in composing a *sensitized photographic collodion*, which would only require to be spread upon a plate to be exposed in the camera, either in the dry or the wet state. It is to the solution of this problem that our present efforts are directed, and we do not despair of its solution.—*Communication to the Société Française de Photographie.*

Proceedings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on the evening of Tuesday, January the 5th; the Hon. Col. STUART WORTLEY in the chair.

The minutes of a previous meeting were read and confirmed, and the following gentlemen elected members of the society:—Messrs. J. HOLROYD, T. MILNER, LACHLAN MCLACHLAN, and Lieut. BROCKHURST.

The SECRETARY then stated that, owing to illness, Mr. Smith would not be able to attend that evening, but that he had sent certain letters and documents relating to the early photographs to be laid before the meeting.

Some of Mr. POUNCY'S transferred carbon prints were exhibited.

A print by Mr. BROTHERS, of Manchester, was shown, and a letter read from that gentleman, calling attention to the fact that mounting appeared to have been the cause of fading.

Some photo-lithographs of maps by Mr. BOURQUIN were exhibited.

Mr. COOPER exhibited some fine specimens of double printing.

Mr. FRANK ELIOT exhibited a work illustrated with photographs, entitled, "Our English Lakes, Mountains, and Waterfalls."

The SECRETARY (Dr. Diamond) exhibited a print by Mr. Fox Talbot, which was very similar to that exhibited at a former meeting as the "Breakfast Table at Etruria Hall," by Thomas Wedgwood, photographed in 1791. He had written to Fox Talbot on the subject, who remembers producing the negative: it was done out of doors, in the cloisters of Lacock Abbey. He thought it was probable that he still had the negative, and that copies might be printed and shown, for comparison with that alleged to be by Wedgwood.

Mr. SHADBOLT asked for the date of Mr. Talbot's picture.

Dr. DIAMOND: 1841.

Mr. SHADBOLT had received from Mr. Taylor, of Edinburgh, what was apparently a calotype negative of a house in Edinburgh, stated to be taken 28 or 29 years ago, which would take back its production to 1834.

Dr. DIAMOND said Mr. Fox Talbot announced his discovery in January, 1839.

Mr. GREENWOOD said that the photograph must be 29 years old at least, as the house had been altered then, and the photograph was taken before that, but how long he did not know.

The CHAIRMAN remarked that this was making a new claim altogether, as the date mentioned was before the discoveries of either Talbot or Daguerre.

Mr. GREENWOOD said the photograph had been in the family for 29 years. He was not at liberty to mention the name, but he knew the facts.

The SECRETARY then read a letter from Mr. Fairholt a gentleman thoroughly familiar with all methods of engraving. He stated that there was no trace of anything like engraving in the paper prints; they were doubtless done by some mechanical method, and not by hand labour. If the monochromes had been shown to him without any particulars, he should have said they were photographs.

Mr. SHADBOLT referred to the fact that the engravings of one of the pictures of Angelica Kauffman, had three figures, and that the picture before them was evidently not a copy of the engraving; the presumption was, therefore, that this was a copy of the original picture in an early stage.

The SECRETARY read a letter from Mr. Robert Hunt on the pictures. He thought the paper pictures were not photographs. Those on the metal plates were doubtless photographs, and if the date of 1791 could be proved, discussion would be at an end. They were probably by a process similar to that of Niepce, practised from 1814 to 1828.

The SECRETARY next read a copy of a letter from Watt to Josiah Wedgwood, in 1799, saying he would try the method of producing silver pictures Mr. Wedgwood had mentioned to him. He also read a letter from Mr. Granley, of Dublin, calling attention to a passage in "Hayden's Dictionary of Dates," referring to Wedgwood as the first photographer.

Dr. WRIGHT said the particulars referred to were extracted from a life of Boulton, published immediately after his death.

The SECRETARY read various other letters referring to the subject, and an extract from a pamphlet issued by Mr. Boulton, a grandson of Matthew Boulton, commenting on the evidence already adduced. Also a letter from Mr. J. J. Cole, giving various particulars, and referring to a patent copying process, the specification of which was dated 1780.

Mr. MALONE produced a collection of photographs done 20 years ago, by Mr. Talbot, amongst which was a print which appeared to him to be identical with that of a breakfast service shown before as having been produced in 1791, by Thomas Wedgwood. He wished also to set himself right in reference to his remark, at a former meeting, that if these photographs had been previously shown to photographers they would never have been suffered to have occupied the time of the meeting. When he made that remark he was not aware that any photographers had examined them, and did not mean to impute ignorance to those gentlemen. Regarding the opinion of those gentlemen who said there was no trace of hand labour or engraving, such opinions must be taken for what they were worth. He thought there were traces of stopping out with varnish, whilst the rest was bitten with an acid. Again, because they were produced by mechanical means there was no reason to suppose that these means were optical, or that the action of light was employed at all. Referring to the metal plates, he had been said to argue from his ignorance. The remark was an unfair one, as he had really spoken from his intimate knowledge. He meant that, having had considerable opportunity of examining the metal pictures of M. Niepce, it was impossible to say from a cursory examination whether these were by that process or Daguerreotypes. He now thought it was very probable they were Daguerreotypes by Miss Wilkinson. He trusted that anything he had said before or now would not be misconstrued so as to appear offensive, but rather taken as evidence of his devotion to the art.

A conversational discussion ensued as to whether the photographs of the breakfast table were identical with that ascribed to Wedgwood, or only similar.

The CHAIRMAN made some comments on the invalidity of Mr. Price's statements concerning the pictures, and expressed a conviction that there was no reason to believe they were not effected by blocks or rollers in the same manner as chromo-lithographs.

Dr. DIAMOND remarked that Mr. Joubert had suggested that the metal pictures should be shown to some copper plate manufacturer. He had taken them to Messrs. Hughes and Kimber. Their foreman, after examining the plates, expressed a conviction that they had been made about 23 or 24 years ago, which would take them to the time when Miss Wilkinson was practising photography. Mr. Smith had some of her photo-

graphs which were evidently what was then known as photogenic drawings.

Mr. GREENWOOD said he knew Mr. Kimber, and, although a respectable man, he did not think his opinion to be trusted, as he had not the slightest knowledge on such matters as the age of a plate.

Dr. DIAMOND was speaking of the opinion of the foreman, not of Mr. Kimber.

Mr. PETER LE NEVE FOSTER wished to know if this were merely an opinion, or was it based on some certain means of judging.

Mr. SHADBOLT had one or two remarks to make as to the possible mode of producing these pictures. The idea had occurred to him that they might have been produced by light and electricity. He had written to a gentleman celebrated for his electrical knowledge, stating his idea, and tried to interest him in this question. That gentleman's health, however, would not permit him to enter into the subject, but he advised him to bring the matter forward. He did not know whether any of the members present had made electrical experiments. He would mention one bearing on what he was going to say. If two powders of different kinds were mixed together, and then placed on a plate of glass, which had been acted upon by electricity in certain parts, the two powders would separate, and show, by the position they assumed, the boundaries of the electrical action. Now, light might produce electrical action, and if a plate of glass were so affected by the light from a camera image, and then submitted to the fumes of carbon, the black particles might arrange themselves in direct relation to the action of light, giving a picture in soot. A sheet of paper rendered adhesive might then be placed on this image, which would give a reversed picture on paper similar to those before them. He threw out this idea as a crude suggestion.

Mr. MALONE said it would be very easy to test such a suggestion. The unfortunate argument against it, was the fact that light was not known to produce electrical action, and they were therefore not entitled to suppose that such a process was possible.

Mr. SHADBOLT did not speak from actual knowledge, but he had laid the suggestion before a very high authority, and on his advice, he gave the suggestion publicity.

The CHAIRMAN said all suggestions were desirable, for whatever the process was, it seemed to be superior to anything they could do now.

A conversation on the comparison of the pictures with the originals followed.

The CHAIRMAN said he had written to Lord Westminster to obtain permission for the Society, through its council, to examine the original of the large picture on the table, but it was at his country house.

Mr. GREENWOOD, said if the Society would take the report of some Liverpool photographers, he would mention the matter to the new Liverpool Society, who would, he thought, willingly go to his lordship's place at Chester, and examine the pictures.

Mr. SHADBOLT thought the society would be glad to receive any report.

The CHAIRMAN did not know that the picture was at Chester. He thought the society should apply to his lordship officially.

After some further conversation,

Mr. DAVENPORT called attention to the plate-mark at the edge of one of the pictures in two colours. He believed that the two colours were produced by a method, once very common, of rubbing in one colour in certain parts, and then inking the whole plate with the general colour. He thought that the pictures were from engraved plates with a very fine grain. There were evidences of certain parts having been stopped out after having been very slightly acted upon by the acid; the remainder then being more deeply bitten.

Mr. CAYLEY objected that printing ink could not be removed from the surface of a print, as the colour from these could be.

Mr. DAVENPORT said, possibly a water colour was used to print with.

After some further conversation the subject dropped.

The SECRETARY read a letter from Mr. Hughes, addressed to the council, asking their official aid in behalf of the Goddard Fund. The council had ordered the letter to be read, and members, as individuals, might contribute. Mr. Bedford had commenced by giving two guineas.

Mr. Henry Claudet and Mr. Heisch were appointed auditors to the accounts for the year.

Mr. ALDIS exhibited a silver camera print taken with the aid of the oxyhydrogen light.

Mr. HENRY COOPER, jun., in response to an appeal from the Chairman, promised a paper on "Double Printing" for the next meeting.

The meeting then adjourned.

THE AMERICAN PHOTOGRAPHICAL SOCIETY.

THE Society held its regular monthly meeting for November on Monday evening, the 9th inst., in the University Chapel, the president, Prof. DRAPER, in the chair; Mr. O. G. Mason, secretary *pro tem.* The minutes of the last meeting were read and approved.

After some routine business, and a resolution expressing sympathy with the family of the late Mr. Fitz in their bereavement,

Mr. GEO. W. EVERETT, from whom a communication was read at the last meeting, presented his improved photometer for the inspection of the society. It consists of a rectangular box, perhaps 1½ inches square and 14 inches long. Passing obliquely or diagonally down it is a piece of printed paper; at the lower end is an opening on the side. On one side of the box is placed a divided scale, marking from zero up to 100°, or solar light. The box is closed by a sliding piece at one side, which has on it a conical tube, intended to look through, and projecting from it a kind of index, which can move up and down on the graduated scale. On looking through the conical tube, and holding the aperture which is on the opposite side in a proper position as respects the light which is to be examined, you see a line or two of the printed paper which is set diagonally opposite. The operation consists in sliding up the eyepiece, until the letters just cease to be visible to the eye; and on looking through the eyepiece, you mark off the degree denoted by the graduated scale when the letters vanish. As you lose vision of the piece of printed paper within, you gain an estimate of what is the force or illuminating power of the ray you are examining. There is attached to the photometer proper a stand, which enables it to be kept in a steady position. Mr. Everett said they could be made for about five dollars.

Mr. TILLMAN considered it a very great improvement, and one that would prove very useful, as a practical photometer which could be used under all circumstances.

The PRESIDENT remarked that the test or criterion of all photometrical instruments was, will the ray produce the same measure, on repeated trials, under the same circumstances. He understood from Mr. Everett that this instrument would. Of course, when viewed by different persons, there would be a variation proportioned to the difference in eye-sight between individuals. This was not like a thermometer, where a fixed point was denoted, that all could see alike; but a judgment had to be expressed as to when the letter became invisible, as was the case in Rumford's method of comparing shadows, and Ritchie's method of comparing lights.

Mr. THOMPSON thought the result would be materially affected by the fact, whether the eye, before making the observation, had been exposed to a bright or dull light.

Mr. JOHNSON suggested that the colour of the light might have some effect.

Prof. SEELY said the criticisms were fair enough; but it must be remembered this instrument was not designed to take the place of an *exact* photometer, used only in a dark room; it was a practical instrument that could be used under all circumstances; and the difference between this and a purely correct result would not be observable in a photograph. He considered the instrument a very great success. He knew of no principle by which the same results could be so readily and so correctly arrived at.

The Theatrical Ghost.—Prof. SEELY described the method used at the theatres of representing a ghost, and suggested that a similar apparatus might be otherwise used for amusement or instruction. If a coloured screen be erected behind, and seen through the plate glass, and an image of a differently coloured screen be seen by reflection, the two colours will be mingled, and the eye perceive only the compound colour. By varying the inclinations of the plate glass or the illuminations of the screens, the effect of varying proportions of colours may be noted. More than two colours may thus be combined by using side reflectors. If one of a pair of stereo pictures be placed behind the plate, the other may be so reflected from the front, that a perfect superposition is effected, but yet no stereoscopic relief should be perceived: the superposed images would only confuse each other—two pictures would be seen with each

eye. If the pictures, however, be small, and the position of the eyes near the plate, each eye will see one picture more distinctly than the other. In these experiments the plate glass should be as thin as possible. At the late meeting of the British Association, Mr. Henry Swan read a paper on substantially the same device, viz., two triangular prisms, each having a right angle, are placed together, broad sides in contact, thus forming a quadrangular right prism; two stereo pictures are placed on sides of this prism, so that one may be seen distinctly through, and the other by reflection from the joining plane. Instead of the plate glass of the ghost apparatus, a plane mirror must be set up; two stereo pictures may be so adjusted to it in front with other plane mirrors, that the reflected images will appear combined to spectators standing in front. But besides the stereo image, others will at the same time be seen, giving such effect as is noticed when the middle partition of the ordinary stereoscope is removed. The best method of exhibiting the stereo pictures to a number of spectators is to combine magic lantern images by means of small adjustable reflectors in the hand of each spectator. This plan was first described by me about six years since. The first account of the ghost device, so far as I am aware, was given by Mr. Direks before the British Association, about three years since. (These remarks were illustrated by drawings on the black-board.)

Lenses.—Mr. Thompson opened the discussion on the subject of Lenses, by saying that he had, on a former occasion, brought a perfect storm upon himself by stating that the Globe lens was not all that was claimed for it. He considered that Mr. Fitz's lens and the Dallmeyer lens both superior to the Globe lens; and in support of his opinion exhibited pictures taken under the same circumstances by the same camera, substituting the different lens. The picture given by the Globe lens was lacking at the corners, while that of the Fitz lens was covered from corner to corner; so that when cut square for mounting, you could have a much larger picture, from the same sized lens, than with the Globe lens: it was well illuminated, and beautifully sharp. Pictures were also taken in much less time by the Fitz lens. In his experience he found the Dallmeyer lens the best, both for portraiture and in the field; although he understood Mr. Fitz had, before his death, made a great improvement.

On inquiry from Mr. Nelson Wright, it appeared there was some difference in the focus in the experiments made, and that gentleman claimed the difference in result was due to that fact For a fair comparison, two lenses of the same size and equal focus are required.

Mr. Tillman said they owed something to Mr. Harrison, whom he considered to be among lens manufacturers what Morse was among telegraphers. He had introduced a new principle, and his Globe lenses had now acquired a world-wide reputation. They were endorsed by the gentlemen of the Coast Survey. He was told by Mr. Harrison that the Fitz lens was precisely like the one he had made two years ago.

Mr. Thompson contended that the Fitz lens differed entirely from the Globe lens in principle. It was claimed for the Harrison (Globe) lens, that it cut a circle of light double the focal length of the lens. He never found it to do so. The Fitz lens gave a picture of equal sharpness, clear to the edge, and was taken in half the time.

Mr. Burgess has tried all the different kinds of lens, and come back to the Globe lens, as, in his opinion, giving the best results.

Colonel Pike said he had used Harrison's lens for two years successfully, and he had used the Fitz lens for three years. Just before his death, Mr. Fitz brought him a lens, two inches diameter, three inches focus, which cut a circle of light eight inches. This was a very remarkable lens, and he considered it the best yet made. The front lens was larger than the back one, and it was mounted differently. One great advantage with Harrison's lens was, that you could go to any part of the street and take a view of the houses. He did not wish to convey the idea that he was dissatisfied with the Harrison lens; he had worked them very successfully, and liked them very much for certain kinds of work; but for certain other work he preferred the Fitz lens to any he had seen.

An animated discussion as to the relative merits of the Globe, Fitz, and Dallmeyer lenses was kept up, Mr. Thompson conceding that for copying purposes nothing could exceed the Harrison lens; and on motion, the subject of lenses was set down for further discussion at next meeting.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, January 6th, 1864.

In the last number of *La Lumière*, M. Gaudin appends some remarks "On the Employment of Pulverulent Iodide of Silver," to his article on that subject which appeared in the Photographic News of the 1st inst. He says,—"The pure iodide of silver, prepared by the action of iodine on silver leaf, being wholly insensible to light, it is necessary that it should be accompanied by nitrate of silver. I have tried, as before stated, the addition of a very minute proportion of pulverized fused nitrate of silver to the iodide, and, at the moment of employing it, exposing it to the steam from boiling water. After exposing the sheet of paper to light under a negative, for a very long time, a picture appeared upon developing with gallic acid, mixed with a small proportion of nitrate of silver, acidulated with acetic acid; but, upon rubbing the picture with the finger, it completely disappeared; it is, therefore, necessary to add to these first two ingredients some perfectly dry albumen, pulverized, and hold the sheet at some distance above the steam from water to moisten it, and afterwards much nearer, in order to coagulate the albumen by a boiling temperature. The action of the steam must be prolonged several minutes, to render the paper thus prepared moist, for passing it only two or three times over it very rapidly will not yield a picture.

"This clearly proves the utility of the intervention of organic matter. The iodide alone is perfectly free from it, even after the application of steam; but in presence of albumen, there is every reason to hope that the iodide will acquire sufficient sensitiveness, which is far from taking place with the steam from water only.

"It will also be interesting to see how this paper, prepared with the argentiferous iodide, will behave with liquid albumen, after being floated upon an exceedingly weak albumen. That will probably be the best way. I have not experimented with liquid albumen, not having any in that state, and thinking only of employing it dry: it is only in writing that the idea occurred to me of trying albumen in solution, and consequently too late to render an account of its effects in the present communication."

Some interesting additions to photographic literature have appeared lately. Spain has at length issued its first photographic journal, under the title of *El Propagador de la Fotografia*, a review of the progress of this art, published twice a month at Madrid, in a quarto, of 16 pages. It is formed on the model of other photographic European journals now existing. The editor says in his prospectus: "Conscious of our own powers, but sustained by our faith in the art, we venture to reckon upon the support of all those who practise photography as professionals, amateurs, or *savants*, to communicate to us their observations, discoveries, and improvements. We shall imitate what has been so usefully accomplished in England, France, Belgium, and other countries; and we have no doubt that all, fellow-countrymen and foreigners, will second our efforts in this important task." The first number contains several interesting articles, and extracts from English and foreign journals. Photographers will welcome this addition to the literature of the art.

M. Dagron, whose microscopic photographs excited so much curiosity and interest at the last Exhibition, has published a very interesting pamphlet, in which he explains, *in extenso*, the method he practises for obtaining these charming *Stanhopes*.

M. Perrot de Chaumeaux has recently published a 12mo volume, entitled "Collodion sec; Exposé de tous les procédés connus:" as the first of a series intended to form a complete cyclopædia of photography; a very laudable undertaking, which it is to be hoped will receive the support it so richly merits. In fact, amid the formidable array of processes, methods, discoveries, inventions, and improvements, it becomes daily more difficult to assign to each person his just claims. An "Annals of Photography" is equally a desideratum, but it is to be feared that however valuable the results, and duly appreciated they would certainly be by many, the sale of such a work would hardly remunerate the cost of compilation.

The little volume under consideration consists of 150 closely filled pages, and gives full details of all the "dry processes" known, including the preservative methods from "nitrate of zinc" down to "tannin." It is a curious history, and an interesting study to see by what slow steps the human mind attains to perfection in any matter of scientific research.

There is also a "Répertoire Encyclopædie de la Photographie," by M. de la Blanchère; the alphabetical portion of which is complete in 2 volumes, 8vo. illustrated with 270 woodcuts, and a continuation in monthly parts.

The Photographic Society of Cadiz has issued a journal, under the title of the *Eco de la Fotografia*, so that Spain will have two journals devoted to the progress of this art.

M. Poitevin has addressed a note to the Editor of *Le Moniteur de la Photographie* respecting his remarks upon the identity of M. Blanquart Evrard's conclusions with those of M. Poitevin; the editor gave his views in the following terms:—"That the reducing agent (developer), whatever it be, by removing from the sensitized collodion the free silver which prevents its keeping in the dry state, leaves the sensitized coating all its homogeneity and photogenic properties." Thus for the tannin exclusively employed by Major Russell, we can substitute sulphate of iron, or any other reducing agent. Every collodion which yields good proofs in the wet state, will do the same when dry, provided it be freed from the agent that prevents it."

"We see," the Editor continues, "that this conclusion of M. Blanquart Evrard's is absolutely the same as that which M. Poitevin has arrived at from his experiments, and the papers presented by each respectively, mutually confirm it.

Upon this M. Poitevin remarks, "In any explanation made from a theoretical point of view, I proved that iodide of silver, insensible to light, may become sensitive under the influence of other agents beside nitrate of silver, the only one admitted hitherto, and I recognised that tannin, sulphate of iron, gallic and pyrogallic acids, possess this property; while M. Blanquart Evrard has operated with non-sensitized nitrate of silver, only before being acted upon by the reducing agent, sulphate of iron, for instance, with the aim of removing the free nitrate of silver, he insists upon a previous washing of the film, first with rain water, and afterwards with distilled water, with the very evident intention of not depriving his iodide film of its sensibility. Moreover, after applying the developer, he washes the film again to remove the latter; he, therefore, cannot attribute to it the property of sensitizing, he employs it only to purify his sensitive coating."

"In applying my theory to practice, I avoid the causes of spots and fogging, which are independent of the action of light, and arise only from the impurity of the products; while the previous application of sulphate of iron employed by M. Blanquart Evrard rather tends to increase these causes if they exist before exposure."

GODDARD TESTIMONIAL FUND.

Sir,—I enclose 5s. 10d. in postage stamps, in favour of the Goddard Fund, being the amount of the winnings at a card party of photographic friends. I also beg to suggest the above as a simple and easy means by which many persons, while amusing themselves these chilly wintry evenings, may also worthily apply their winnings.

Ace of Spades.

FRONT LIGHT AN ERROR.

Dear Sir,—The "vexed question" of the meaning of "front-side," and "side-front light," appears inexhaustable if we may judge by the accounts published month after month in the journals. I for one, am completely tired of the subject, and regret that valuable space should be so thoroughly wasted in arguing the meaning of terms which one would suppose a child must understand. I do hope that the very able remarks you have appended to the article on "Front-light and Side-light," also on "Mr. Helsby's glass-room," will have the effect of settling the matter. I have been consulting Dr. Johnson again, to know if I had forgotten the meaning of "front" and "side," but I find he describes it just as I learnt it while a boy, and as I have understood it for the last fifty years. It is a pity that any one should be so completely mistaken as to suppose that roundness or relief can be obtained with a front-light, it is simply absurd to expect it, and any one acquainted with the principle of light and shade, would never attempt it. In the course of my practice as an artist and photographer, I do all I can to secure "side-front-light" as the principal one, and make every other subordinate to it, and I certainly have succeeded in getting my best pictures under those conditions. I often wish to have more light in my glass room, that the time of exposure might be shortened, but as so much greater effect is produced by a graduated light, I willingly forego the former to secure a more artistic picture, and I find my sitters better pleased with the result than if I had given less time for the operation. I am sorry to trouble you with this, but I felt compelled to make an observation on the subject, after reading the very unsatisfactory arguments on lighting a glass room, contained in the number of the News just issued.—I am, dear sir, yours truly,

Buchanan Smith.

I enclose a portrait or two taken with the light on the sitters, as I have never committed myself by using a *front light*. I cannot send any to contrast with them.

[We have felt it necessary, in an article in the present number, to place the subject beyond further dispute, at least as regards its terminology. The immense importance of the subject is the only excuse for permitting it to occupy so much space and attention. We owe a duty to photographers not to permit them to be misled either by mis-statement of fact or erroneous theory. We are obliged to our correspondent for aiding us in the discharge of that duty, Ed.]

SILVER IN THE WHITES OF FIXED ALBUMENIZED PRINTS.

Sir,—Having seen the subject of free nitrate of silver in the whites of albumenized paper prints very often discussed in your very useful paper, allow me me to describe a very simple and effective remedy which I have practised for some time. I have found in some samples of paper, more especially those containing a large per centage of chloride, that, however carefully the prints were washed, toned, and fixed, that, on drying, the whites went a dingy yellow, and the tone of the picture altogether unsatisfactory. This was the case, whether entirely new hypo, or hypo which had been used before, was tried. I found that the chloride and free nitrate did not dissolve in the hypo, but formed a compound which was insoluble in it. It then struck me that as iodide of silver is soluble in hyposulphite of soda, if I soaked the prints, after toning, in a solution of iodide of any kind, and then fix them in hypo, the prints would be improved. I made a solution of twenty grains of iodide of potassium in about a pint of water, and after toning and

* M. Poitevin's paper was inserted in our Vol. VII. p. 578, and M. Blanquart Evrard's paper appears in the present number, see page 18.

rinsing in a few waters, allowed the prints to soak about five minutes in the iodide, or until they turn a primrose colour, rinsed them again once or twice, and then fixed them in new hypo. of the strength of five ounces to the pint. This I have found answer very well, and it has the very great advantage, that when the yellow-looking iodide disappears in the hypo, it is a certain sign that the print is sufficiently fixed, and the prints do not change in the least in the hypo.

Will you also kindly allow me to mention a subject in my own justification? A friend has pointed out to me, that he has seen it mentioned in some of the photographic journals, that the idea of my glass room, which appeared in your paper, and which you have done me the honour to notice again in this year's Almanac, was borrowed from Mr. Sutton. May I beg that you will allow me this opportunity of denying that statement? I have strongly advocated that form of glass room for years, and built one myself of that form seven years since, which I can prove beyond a doubt, if necessary, and that the idea, such as it is, is my own.

The method of fixing, described above, will be found, I believe, to give the nearest possible approach to permanency.

Hy. Matheson.

January 2, 1864.

[We do not remember that any currency has been given in our pages to the idea that Mr. Matheson's excellent form of glass room is not original with him, which we see no reason to doubt. Even if the similarity between it and Mr. Sutton's were greater than it is, they might have been conceived by each independently. But there are essential differences between the two. In Mr. Sutton's original design, there was no top light at all; but a high front light and side lights.—Ed.]

Photographic Notes and Queries.

M. Poitevin's New Tannin Process.

Sir,—Among the many very useful notices in your valuable journal, which I follow with attention, and from which I have already derived much good for some time past, three recent numbers—those of 4th, 11th, and 18th inst.—contain articles which seem to me of the greatest interest and importance. I refer to those which treat of the sensitiveness imparted by tannin to the silver film of negatives, and, in particular, to the extract from the *Moniteur de la Photographie*, by M. A. Poitevin, pp. 578 and 579 of your 7th volume. I am, no doubt, not the only one of your grateful readers who are anxious to give that gentleman's suggestions a trial; but in order to proceed with any chance of success, it is first requisite that the details of the paper in question be perfectly understood. The following are the points which do not appear clear to me, and I would feel much indebted to you, if you could throw some light upon them for the use, not only of myself, but of all other ardent searchers:—

1st. What is the exact meaning of the latter part of the 2nd paragraph, beginning with the words "It is *nil*," and ending, "to separate?" Is it to be understood thus, "when it is isolated from all such iodized substances as light has the effect of separating from the iodine therewith combined"?

2nd. Is the bath of 8 or 10 per cent., spoken of in the last line of the first column, page 579, to be iodized in the usual way of ordinary nitrate baths, or one of pure nitrate of silver solution? Should it be acid, alkaline, or neutral to litmus paper?

3rd. Is the washing spoken of at the end of the same paragraph at the top of page 579 to be effected with distilled water, or will ordinary water do as well?

4th. In the following paragraph, do the words, "the solution of nitrate," refer to the aforenamed sensitizing bath of "8 to 10 per cent.?" If so, it would solve the first part of my second question.

5th. Is the "aceto-nitrate of silver of 2 or 3 per cent.," which is to be poured on to the exposed surface in order to bring out the latent picture, to be drained off again previously to the application of the developer?

6th, and lastly. Is that aceto-nitrate of silver to be decidedly acid, or only slightly acid?

As soon as I can obtain the above information, and that circumstances will permit, I intend making the trial, and shall feel happy to report progress, if you will permit me to do so, through your valuable journal, for the benefit of my fellow photographers.—I am, Sir, yours truly,

Caroline C. Bertolacci.

27, *Abingdon Villas, Kensington, W.*
Dec. 24, 1863.

[There is a slight amount of ambiguity in the style of M. Poitevin's article, possibly from the modes of operating as well as the modes of thought and expression slightly differing from those with which we are familiar. Where there is any doubt as to his meaning, we cannot, of course, speak with absolute certainty as to the intention of the phrases; but we can, probably, help to a tolerably clear understanding on the interesting and important subject treated. The meaning of the second paragraph is probably this: That light is without action upon pure iodide of silver unless some body be present capable of combining with the iodine and retaining it when the light separates it from the silver with which it is combined. 2. The bath of nitrate of silver is, we presume, iodized in the ordinary way. It should, probably, be neutral. 3. The washing water should be distilled. 4. Doubtless the same solution of nitrate. 5. We should certainly drain off any excess. 6. The amount of acid used with the silver will be somewhat regulated by the proportion added to the developer. If there be little acid in the developer, the silver should be freely acidified, and *vice versa*. We shall be glad to hear of your success.—Ed.]

Nitrate of Soda in the Printing Bath.

Dear Sir,—Having experimented largely with the nitrate of soda, and also having launched the first theory with regard to its action, I feel bound to take up the cudgels in its defence, when its honour is assailed. Every sample of paper, good, bad, and indifferent, that I can lay hands on, is submitted to its influence, with never-failing success. The discrepancy that occurs in the experience of "A. D. E." can be easily accounted for; he has experimented with an article adulterated with carbonate of soda, whose presence is not sufficiently marked to deteriorate the better samples of paper, but on submitting a stale or inferior kind of paper, the results follow as described in his letter. I have recently tried a sample that was condemned as useless nearly six years ago, and obtained some very decent prints. Having a little of this paper still by me, I intend striking off a proof or two, which will be forwarded for your inspection.—Yours respectfully, A Photographer's Assistant.

Talk in the Studio.

Removing Writing Ink from Photographs.—Make the following solution:—Oxalic acid, 1 drachm; warm water, 1 ounce. Dissolve and keep at a temperature of about 100° Fah. Pour water of the same temperature over the photograph several times until the paper becomes thoroughly saturated and moistened. Next flow it with the above solution, and rub it gently with a clean camel's hair pencil. The ink will gradually disappear; and as it disappears, repeat the operation of washing with lukewarm water, and again flow with the acid. With patience and perseverance you will finally have the ineffable pleasure of seeing your dear "little Charlie" once more. As soon as the picture has been thoroughly restored, and the whites are perfectly bleached, wash very carefully in several waters, so as to remove every trace of the acid or the salt which it formed, which, if left, might produce iron-moulds. Our trouble in thus communicating with you will be abundantly remunerated by your success.—*Humphrey's Journal.*

Glass Beds for Rolling Presses.—Mr. Bourquin has recently introduced a most important improvement into his rolling presses. Instead of using a bed or plate of polished metal to give the fine surface to the print, he uses a plate of polished glass. Steel is very liable to rust, and to various other injuries, from which glass possesses a complete immunity. The surface is fine, not liable to indent, rust, or twist, is readily cleaned, and always in order at a minute's notice. The only

doubt which occurred to our mind was to the question of breakage, we knew that a thick glass is readily broken if the pressure were uneven. We found, however, that a perfectly even pressure is secured by the glass plate, about an inch thick, being bedded in cement, thus securing a perfectly even bearing. Mr. Bourquin informed us that four months' careful trial had satisfied him that there need be no danger of breakage. The presses have also some improved mechanical appliances, and give a good surface very readily. In our own hands the results have been very satisfactory.

To Correspondents.

R. MARCHANT.—If you damp your cards on both sides just previous to mounting the print, they will be less apt to curl afterwards. A very simple and rapid plan of damping cards for letter-press printing is practised by printers: about 40 or 50 cards are held firmly by one end in the left hand, just above a vessel of water; then by a dexterous sweep of the fingers of the right hand they are dashed one by one in rapid succession through the water, which wets them rather more than half way up each card. The end is reversed and the same operation performed. A few hundred cards are thus damped in a few minutes. 2. We are not familiar with the prices of glass-houses. Mr. F. W. Hart recently exhibited a model at a South London meeting, which was described in our report as 24 feet by 10 feet, which would cost £30. It was to be made of corrugated iron. Possibly, if you communicate with him, 52, Canterbury Road, N., he may give you further information.

PARVUS, No. 48.—The best kind of background to be exposed to the changes of the weather will be canvas painted in oil, we should think; but we fear any background will suffer in such circumstances. It is difficult to obtain much control over the lighting of the figure in the open air. If you can, however, place the sitter where two walls form an angle, so as to shelter one side, it will be an advantage. It is also desirable to have some means of screening the sitter from direct vertical light. But, in the absence of a glass-house, a little ingenuity must be used to make the best of your special appliances. The chief fault of the picture you send arises from a want of control over the direction of the light; there is an equality of diffused light all round which is destructive of pictorial effect. There are three photographic societies in London; *the* Photographic Society of London and two suburban ones. You will find the details regarding them in our ALMANAC just issued. Attendance at a society is always an aid and pleasure to an amateur.

A. YOUNG.—The term, "large portraiture," is somewhat indefinite, but we should think that the No. 3 of the maker you mention would answer your purpose.

GALLOIS.—The general design of your proposed glass-house is good. The only disadvantage of making the shaded part at the top of your side window opaque, would arise from dividing your top and side light into two distinct lights, and it is desirable that they should form one continuous light. You may make all the shaded part which is behind the ridge opaque, and that in front of the ridge glass. Then let your curtain rod run in the same slope as the top glass. We see no reason why you should not use the water for the ordinary purposes of washing, &c.

G. L. S.—The question of tone is largely a matter of taste; but by all means avoid a co'd black, or slatey hue.

AMATEUR PHOTOGRAPHER.—There are several toning baths which will keep for months, as you may ascertain by consulting our ALMANAC. The acetate bath, and the bath simply containing chloride of gold and chloride of lime, keep well. We are now using one of the latter, which has been made for two or three months, and gives excellent results. The fixing bath should not be used over and over; but if used for one or two prints only, and kept neutral or alkaline, it may be used again. 2. The addition of alcohol is said to keep the printing bath from discolouring; making it with common, instead of distilled, water, sometimes answers the same purpose. 3 Sensitized paper may be kept in a chloride of calcium box for weeks. If rolled up tight, it will generally keep a few days. 4. It will be difficult to remodel an old lens, and, probably, would cost more than a new one. 5. The safest mode of getting rid of the hypo from fixed prints is careful washing in constant changes of water, letting the prints thoroughly drain between each change. Three or four hours washing will be sufficient, if done well.

GEORGIUS.—We believe genuine paraffin is not explosive, except at a very high temperature. There is not, we think, any danger of an explosion whilst filling a lamp. The paragraph to which you refer might have no reference to paraffin, the word is often used incorrectly.

PINHOLES.—If your gold has not from some cause become precipitated, we should expect it to tone on adding a very little of a fresh solution of chloride of gold. Such has always been our experience. Or try the addition of a little hydrochloric acid. If you finally fail, precipitate your gold with sulphate of iron, and reconvert it into chloride in the usual way; but we do not conceive that there should be any need for such a step. 2. Dilute your bath with an equal bulk of water, which will precipitate the excess of iodide, then add silver to make up the proper strength. We presume that our YEAR-BOOK may be had of all booksellers and newsagents.

M. GOLDING.—There are various methods of making copying ink, almost all consisting in the addition of sugar or syrup to common writing ink. From an ounce to an ounce and a half of sugar to a pint of ink will generally be sufficient.

W. R.—It is a matter of individual taste and judgment. Personally, we do not like velveteen, and prefer the bellows of leather, concertina fashion. We have used cameras of the latter form for ten or a dozen years without disadvantage. We think them less liable to dust than the velveteen. As for projecting so as to cut off the margin of the plate. We believe, however, that they are easily obtained to order with velveteen bodies.

N.—In order to state formulæ with strict accuracy it is necessary to state, in reference to fluids, whether parts by weights or parts by measure are intended; but in the absence of such statement, we should always understand fluid measure to apply to fluids. In reference to a fluid like sulphuric acid, the specific gravity of which differs so largely from the standard of water at 60°, we should always, in stating formulæ ourselves, say weighed or measure ounces or parts, as the case might be, and we frequently find it so stated. Will N. state his reasons for assuming that parts by weight should always be assumed?

DENMARK.—We have made enquiry, and learn that, if you have not received the specimen, it is from some oversight. Write again to T. F., and explain.

F. G.—You were perfectly right in drying your chloride and carbonates, and not far wrong in your proportions; but altogether wrong in your method of working. The mixed chloride of silver and flux should be thrown into the heated crucible a little at a time, or it will boil over. It should then be left in a bright red or white heat for about half an hour. You will find an article with detailed instructions in our YEAR BOOK just issued. We have always pleasure in suggesting remedies for the difficulties of our readers, and we do not make a charge for any aid given in these columns.

P. T. C.—We do not approve of the use of ammonia for neutralizing negative baths, because the nitrate of ammonia formed will hold in solution oxide of silver, and often induce a fogging condition in the bath. 2. Streaks often proceed from the condition of the bath; see the article to which you refer in the ALMANAC for a remedy. Marblings often proceed from the collodion, and the best remedy is a fresh sample. We have forwarded your letter.

W. H. N.—It is important, in all dry processes, to ascertain at the outset that the bath, &c, are in good working order. If the bath or collodion fog with wet plates, it is very likely to do so with dry ones. In using the tannin process for transparencies, rapidity is not an object, and it is easy to secure cleanliness by using old collodion, a strong tannin solution, and an acid bath. If you do not wish to alter the condition of the bath at any time, and want more acid, add a little acetic acid to the washing water, or a trace to the tannin solution. Care, cleanliness, and perseverance will ensure success. There is a little tendency to under-exposure in your prints. This is a common fault of beginners, which you must guard against. As to the dark box in question, we think you will, probably, find it very useful, and so far as we know, not unreasonable in price. Besides, any one is at liberty to make it for himself. We cannot tell you of any one likely to repair the broken film to which you refer. We shall always be glad to aid you in any specific difficulties, if you describe them clearly.

C. H.—We have several times recently had samples of excited albumenized paper sent to us covered with spots similar to that you enclose. They present every appearance of being produced by the paper being splashed with something; but the frequent recurrence of the same defect recently tempts us to suppose the fault may be due to some defect in the original paper. We are at a loss, however, for the cause.

FANNY'S BOY'S SISTER.—We prefer *a*; *c* and *d* are also good. 2. A good portrait collodion will often answer well, also landscapes. 3. We have no experience of the articles by the maker you mention. 4. Photographs are registered at Stationers' Hall. Forms, 1d. each, are supplied there, and 1s. is paid with each photograph registered. See instructions in our YEAR-BOOK just issued.

WM. G., F. & T., ZERO, and others.—The only mode of obtaining our presentation print at a low price is by purchasing the number containing it. We believe copies may be had from Mr. Dallas at 1s. each.

J. JAMBIN.—The photographs are handed to our publisher for registration. We shall be glad to receive copies, and will then examine them carefully, and give our opinion.

SODIUM, and several correspondents, in our next.

THE GODDARD TESTIMONIAL FUND.

In adding the following list of fresh subscriptions, it is necessary to state that it does not necessarily include all the subscriptions received since our last, but only those which have reached us at the time of going to press. We believe that Dr. Diamond, Mr. Shadbolt, and Mr. Hughes have also received some, the particulars of which have not yet reached us.

	£	s.	d.
Subscriptions already received	86	18	0
Messrs. Carpenter and Westley	5	5	0
George Nottage	5	5	0
Lock and Whitfield	5	5	0
H. Herring	2	2	0
W. Warwick King	1	1	0
J. Hetley	1	1	0
W. H. Warner, Ross	1	1	0
J. Ashley, Retford	0	10	6
W. Tilley	0	10	0
Spero	0	10	0
Pint of Collodion	0	7	6
Winnings at Cards	0	5	10
W. Fisher, Filey	0	4	0
	£110	5	10

Photographs Registered during the Past Week.

MR. THOMAS HICKIN, 71, Buckingham Street, Birmingham,
Two Photographs of Dr. F. R. Lees,

MR. JOHN STRINGFELLOW, Vicar Lane, Chesterfield,
Photograph of Wm. Burkett, Esq., Mayor of King's Lynn,

MR. PETER SKELTON, 12, Promenade Villas, Cheltenham,
One Photograph of the Poet Burns
One Photograph of Col. M. Nichol Burns, Son of the Poet.
One Photograph of Lieut.-Col. James G. Burns, Son of the Poet.
One Photograph of Dr. Borraston, Bishop of Tasmania.
One Photograph of W. C. Macready, Esq., Tragedian.

Works for Review, and Communications to the Editor, to be addressed to 32, PATERNOSTER ROW.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 280.—*January* 15, 1864.

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WEAK PRINTING BATHS: NITRATE OF SODA, &c.

THE question whether it is possible to save from £30 to £40 sterling out of each £100 expended in silver for printing, is one of too much importance to be hastily dismissed by a reference to foregone conclusions, or what photographers believed so many years ago. That strong nitrate baths—that is, baths containing from sixty to a hundred grains of nitrate to each ounce of water—were conducive, if not absolutely necessary, to successful printing, is an opinion which has been held for years, and endorsed by the practice of able and experienced printers. We have held the opinion ourselves, and constantly promulgated it. We maintain still that it is a safe method, especially with weak negatives, of obtaining vigorous prints. But the question which now engages the attention of photographers is as to the necessity, with good negatives and skilful manipulation, for the use of baths containing from sixty to one hundred grains of nitrate to the ounce, when equally good results may be obtained by the use of thirty or forty grains to the ounce.

We are met at the outset, we know, by arguments such as were used in a recent number of a contemporary, to the effect, that admitting, for argument's sake, the possibility of equally good results, no such saving as that to which we have referred is effected, because as each atom of alkaline chloride in the paper must decompose its equivalent atom of nitrate of silver, whether the solution be weak or strong; and because, therefore, weak solutions are rapidly exhausted, whilst strong ones can be used to the last drop; and finally, because any excess of silver employed may be saved by duly collecting and reducing washing waters and other residues.

These arguments are, we think it is easy to show, fallacious, and based upon error of fact or deduction. The first is an error of deduction. That each atom of alkaline chloride in the paper will decompose its equivalent proportion of nitrate of silver, is a truism which no one will dream of disputing; but that therefore strong baths are necessary, or that nothing is saved by the use of weak ones, we deny. It is, indeed, upon the fact that each atom of chlorine must combine with an atom of silver that the strongest argument for weak baths is based. Let us examine the question a little more in detail. We learn from Mr. Hardwich, who in matters of fact is generally a very trustworthy authority, that each sheet of paper generally takes up in albumenizing about six drachms of the solution. The proportion of soluble chloride contained in this solution will vary, of course, with the formula used; but assuming the albumen to contain eight grains to the ounce of solution, which is about the average proportion used by manufacturers of albumenized paper, each sheet of paper would contain six grains of chloride of ammonium. Each sheet would require, therefore, about eighteen grains of nitrate to convert all the soluble chloride into chloride of silver. Assuming, then, that each sheet of albumenized paper removed the same amount of nitrate solution as was removed from the albumen solution, six drachms of a 24-grain nitrate bath would be required to excite each sheet of paper. But it is, perhaps, fair to assume that the quantity of nitrate solution removed by each sheet is considerably less than the quantity of albumen solution, the silver solution being less glutinous. If only four drachms of nitrate solution—which is considerably less than the fact, we believe—were taken up, the bath would require to contain thirty six grains to the ounce to complete the decomposition, without impoverishing the stock of solution. The amount required for combining with the albumen is so small that it need scarcely be taken into account.

It will be thus seen that there is no need of strong solutions to afford to each atom of alkaline chlorine its atom of nitrate of silver without rapid exhaustion of the bath; and that if any bath would work to the last drop, one containing, say, at most forty grains per ounce, might do so as well as one containing eighty grains to each ounce. The truth is, however, that neither strong baths nor weak baths work to the last drop without becoming impoverished. From some cause not altogether well determined, all baths get weaker, parting with nitrate of silver in larger proportion than they part with water, and in a ratio bearing no proportion to the amount of chloride brought into contact with them for decomposition. We some time ago made a 60-grain bath; after using it a few weeks, at intervals, we tested it, and found it contained twenty grains of nitrate of silver to the ounce, although it was still giving us good prints. In one of Mr. Spiller's quantitative experiments, he records that a 70-grain solution was found, after exciting five sheets of albumenized paper, to contain only fifty-seven grains to the ounce. All practical printers are familiar with the fact that the strength of the bath is constantly getting less. A strong bath is, of course, longer in getting exhausted than a weak one, simply because there is more material to work upon. It is probable that a portion of this excess of silver absorbed, beyond what is necessary to decompose the chloride, combines with the organic matter of the paper, and forms a compound favourable to instability. It is possible that an argument against strong solutions might be based on this, as favouring the formation of this compound and causing fading.

And lastly, as to the argument that there is no waste in using unnecessarily strong solutions, because the silver may be recovered. Setting aside the fact that the majority of amateurs, and many professionals, do not save their residues nor recover their silver in any form, on the ground that *le jeu ne vaut pas la chandelle*, the result not, in their hands, being worth the cost, it must not be forgotten that at best only a percentage of the excess is recovered. We have heard of a gentleman who had given great attention to the collection of residues, and the recovery of the silver, obtaining about sixty per cent. of his original expenditure. Mr. Spiller in a very careful experiment for determining the question found that, using the utmost delicacy and care, about eighty-two per cent. of silver expended might be recovered; but he also found that less than two per cent. of the amount was absolutely found in the finished picture. Thus a loss of

sixteen per cent. was inevitable in a very carefully conducted experiment; and how much more in the ordinary mode of conducting the business of the printing room may be easily imagined.

The fact that, if equally good results can be obtained, there is great economy in using weak solutions, we think is satisfactorily established; and also that there is no chemical reason why strong solutions are necessary. The matter then resolves itself into a question of practical results. What is the opinion of practical men? So far as we can learn, there appears a tendency amongst experienced printers to revert to much weaker baths than they have been using. Whether from a change in the character of the negatives, a difference in the preparation of the paper, rendering a change in the strength of the bath necessary or desirable, or from a conviction that their former opinions were wrong, there appears a tendency amongst many to give up strong printing baths. Mr. England, who has just issued some of the most perfect prints we ever saw, unexceptionable for brilliancy and purity, now uses a 40-grain bath where he used to use a 60-grain bath. Messrs. Sedgefield and Eliot now use a 40-grain solution, whereas at one time they used one of 80 grains. Mr. Blanchard, with the excellence of whose prints many photographers are familiar, has for some time been using a 40-grain bath, and as he recently informs us, with a more weakly salted paper he is now using a 30-grain bath with equally good results. We might multiply instances, but we prefer to call attention to those in which printing is conducted on such a large scale as to give their example great value.

Theory, whilst it teaches us that a given amount of nitrate of silver must be decomposed by a given amount of a soluble chloride, does not aid us in ascertaining the proportion of free nitrate necessary to secure the best results. We know that free nitrate is necessary: how much, is not decided. Practice becomes really the most trustworthy guide. The careful examination and comparison of the methods of several successful printers has shown us that the best results are obtained where the nitrate bath contains five or six times as much nitrate of silver to the ounce as the albumen contained chloride of ammonium or sodium. If the formula given by able photographers be examined, it will be found that this relation is very nearly maintained. Mr. M. Lyte used an albumen solution, containing 20 grains of salt and a 100-grain silver bath. Mr. Mayall uses a solution with 13½ grains of salt and a 100-grain nitrate bath. Mr. England uses a solution containing 7½ grains* of chloride and a 40-grain silver bath. Mr. Williams, when he uses a solution containing 5 grains of chloride, uses a 30-grain nitrate bath. Various successful commercial printers, using commercial papers, which usually contain 8 grains of chloride to the ounce, use a 40-grain nitrate bath. Amongst these we may mention Messrs. Sedgefield and Eliot, Mr. Blanchard and others.

The question, which is really one of relation, has, unfortunately, too often been treated in the abstract, and strong or weak baths have been spoken of without any reference to the proportion of chloride used in the paper. If weak salting solutions give the most vigour, and the experience of such men as Mr. T. R. Williams, Mr. England, and others, who have prepared their own paper for years, seems to place the question beyond a doubt, then it appears that, with such paper, weak baths may be used with as much advantage as economy. It should not be forgotten, however, that very weak solutions tend to dissolve the albumen, and thus injure the brilliancy of the print; and that, with a poor negative, a strong solution will aid in securing a brilliancy which, under ordinary circumstances, the negative would not yield.

Regarding the use of nitrate of soda, less certainty prevails. Since the subject was first brought under the attention of photographers by one of our correspondents, a great deal of valuable experience in connection with it has been brought under our attention. Mr. Taylor, of Edinburgh, has stated in a contemporary, that one of the most successful professional portraitists in Edinburgh uses it with great success. Various of our correspondents have sent us very successful prints produced by its aid. Our contributor, "A Photographer's Assistant," has experimented largely with it, and has sent us some charming prints produced with a weak bath containing this salt. Mr. Harman exhibited at the North London Photographic Association, in October, some specimens excited on a 20-grain bath with 60 grains of nitrate of soda, which were highly satisfactory. It is but right to add, that Mr. Harman has since informed us, that he is not able to perceive any difference produced by the presence of nitrate of soda. Mr. Hart has given similar testimony. Some of our correspondents have met with strange failures, which suggest the idea that they have either not used nitrate of soda at all, or met with very impure samples. In America, similar discrepancy of opinion and experience prevail. The Editor of the *American Journal of Photography*, in a recent number, says: "One of our subscribers, Mr. Loefler, of Staten Island, has shown us prints, made with a solution of 30 grains of nitrate of silver, and 30 grains of nitrate of soda to the ounce of water, which were quite equal in brilliancy and strength to other prints from the same negative, with the bath at 90 grains. The same good result has been obtained by others here and in England. The fact seems to us, then, fairly established, that, in certain circumstances, prints of the very first quality may be made with a bath weak in silver." He proceeds to add that some others have failed, and that Mr. Loefler is not always equally successful with every sample of paper. This is just what might be expected. With a heavily salted paper, a weak bath would not give good results, either with or without nitrate of soda.

The question is very naturally asked, "What is the use of nitrate of soda?" We cannot with certainty say; but that does not prove that it is useless. It is certainly not for the purpose which some have funnily supposed, of taking the place of silver. It is not, of course, reduced like silver, and forms no part of the image. But we are by no means certain that it does not facilitate the necessary decompositions taking place to form the image. The chemistry of the subject is too little understood to permit any one to dogmatize; and we are not warranted in saying, because we do not know of any chemical reaction between certain substances likely to affect the printing, that, therefore, no action can take place. But it will be seen, on reference to a brief article by Mr. Spiller in the present number, that there are chemical reasons for supposing that the alkaline nitrates do aid the necessary decompositions in printing, and that the nitrate of lead does so in a very marked degree. The subject is of sufficient interest to be worthy of careful experiment and observation. At present, we want further facts. Neither the hasty adoption without examination, nor the hasty and contemptuous dismissal as *unphilosophical*, which often merely means *misunderstood*, will serve any good purpose to photography.

* Mr. England uses 5 grains of chloride of ammonium and 5 grains of chloride of barium, which are about equivalent to 7½ grains of chloride of ammonium. Mr. Williams uses 10 grains of chloride of barium, equivalent to about half the quantity of chloride of ammonium.

THE ACTION OF CHLORINE UPON NITRATE OF SODA.

BY JOHN SPILLER, F.C.S.

PURE nitrate of soda, in aqueous solution, dilute and cold, was submitted to the action of a current of chlorine gas; very little was absorbed, and that which was taken up was dissolved as free chlorine. Indicated by odour and property of bleaching litmus paper.

Kept for an hour in the dark, the solution had not altered in character. (By the action of light chlorine is known to decompose water forming hydrochloric acid.)

The solution was now heated gradually to boiling. It

lost the odour of chlorine, became acid, and when tested with litmus paper, turned it red without bleaching.

The liquid was then evaporated to dryness over a water bath, a portion of the nitric acid was expelled, and the crystalline residue now contained chlorine in union with sodium, or, in other words, consisted of a mixture of nitrate and chloride of sodium.

The same result was observed in a similar experiment made upon a much more concentrated solution of the nitrate of soda.

But, substitute nitrate of lead for the soda salt, and the case is altogether different. I find that by passing chlorine gas through an aqueous solution of the nitrate of lead (PbO, No_5) it is more quickly dissolved, forming, on the one hand, Pb Cl, whilst the oxygen unites with another atom of chlorine to produce hypochlorous acid, Cl O, which imparts its characteristic odour to the liquid, and quickly bleaches litmus. By boiling, this last product may be driven off, but the chloride of lead remains.

It is thus proved that nitrate of lead exerts a more direct action upon the chloride of silver when exposed to light (a fact already referred to in my papers on "The Alteration of Chloride of Silver by Light," (Photographic News), and "On the Composition of the Photographic Image." (*Philosophical Magazine*, March, 1860) and, therefore, facilitates its reduction more than either of the alkaline nitrates, and much in the same way as nitrate of silver does. I would, therefore, suggest the addition of nitrate of lead to the silver bath employed for printing purposes, and, in order to overcome the practical inconvenience of the lead precipitating as carbonate or sulphate during the preliminary washing of the prints, would add a little tartaric acid, or better, citric acid, to the first wash water.

By the use of a mixed solution containing the nitrates of silver and lead in the proportion of 40 grains of each ingredient to the ounce of distilled water, prints were obtained on albumenized paper in the usual time, which toned easily, and were vigorous and equal in every respect to those produced with the employment of a much more concentrated solution of the pure nitrate of silver. The only apparent difference was to be noticed when the prints were taken from the pressure frame, at which stage the sheets prepared with lead exhibited a more decidedly red colour.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Adulteration, and Analysis.

Tin (*continued*).—Both the iodide and bromide of tin are likely to be, or have already been, proposed for use in photography. The protoiodide of tin is prepared by heating tin filings with a two-fold quantity of iodine; a brown-red translucent body is formed, which is easily fusible, and separated by heat into two compounds, the protoiodide Sn I and the biniodide Sn I_2 the latter volatilizing at 180° C, whilst the former is fixed at a red heat. The protoiodide dissolves in water sparingly, but without decomposition, fuses readily, and forms a dark red crystalline mass, yielding a powder similar in appearance to red lead. When a dilute solution of protochloride of tin is mixed with a very slight excess of iodide of potassium, a large quantity of yellowish red crystalline tufts are soon deposited. These likewise consist of protoiodide of tin, and dissolve in water without decomposition; they are more soluble in warm than in cold water, and crystallize from a hot solution in fine yellowish red needles. A convenient method of preparing hidriodic acid is to heat an excess of tin with iodine, and a large quantity of water; violent action ensues, the tin is rapidly oxidized, and a solution of hidriodic acid is formed, containing but a trace of tin. On dissolving in an aqueous solution of iodide of potassium, half as much iodine as it already contains, and adding protochloride of tin to the solution, a colourless mixture is obtained, which yields no precipitate, but on evaporation deposits a yellow powder, slightly soluble in water, consisting, according to Boullay, of sesquiiodide of tin. The biniodide of tin, which is separated by sublimation, from the mixture obtained by heating tin with twice its weight of iodine, forms orange yellow shining crystals, which are easily decomposed by water.

The protobromide of tin is a greyish-white lustrous compound, easily fusible, formed by heating tin with hydrobromic acid gas. It dissolves in water without decomposition. It may also be prepared in aqueous solution by dissolving tin in liquid hydrobromic acid. The bibromide of tin is a white, crystalline, easily fusible, and volatile compound, prepared by placing tin in contact with bromine; the metal taking fire spontaneously. It dissolves in water without apparent decomposition.

Lead.—We now come to the very important metal, lead. In the metallic state this metal is invaluable for chemical and manufacturing purposes, on account of its non-liability to be attacked by various corrosive liquids; thus, in the manufacture of sulphuric acid, the chambers where the sulphurous acid and nitrous gas are allowed to mix, are made of lead. The large tanks and reservoirs in which precipitations are effected, acids are concentrated, or corrosive liquids stored, are also made of lead; this metal being chosen both on account of its inactive chemical character and its soft and convenient mechanical properties. The ease with which it resists the action of atmospheric influences, and the comparative low price with which it is met with in commerce, point this metal out as the most convenient substance for covering roofs, or for lining cisterns, as well as for the manufacture of pipes for the conveyance of water, &c. Unfortunately for these latter uses, the compounds of lead are very poisonous; and as the coating of tarnish which the surface of this metal rapidly acquires when exposed to the atmosphere, and which consists principally of oxide of lead, is slightly soluble in water, it is evident that very serious results are likely to arise when water so impregnated is employed for drinking or culinary purposes. By one of these happy adaptations of natural phenomena to human advantage, which goes by the name of *chance* or *design*, according to the feelings and habits of the speaker, lead, although strongly acted upon and dissolved by pure water, is entirely protected from this solvent action when carbonates or sulphates are present; and since most natural waters, which would be employed for domestic uses, contain comparatively large quantities of both these ingredients, the result is, that in nine cases out of ten lead may be employed with impunity for the storing or conveyance of water for household purposes. The action is as follows:—Under the combined influence of the atmospheric air and moisture, lead rapidly becomes coated with a layer of protoxide, which possesses this property in common with the alkalies that it is soluble in water and alkaline to test paper. The compounds which lead forms with carbonic acid and sulphuric acid are, on the other hand, insoluble in water, the carbonate especially so; consequently, when the soluble alkaline oxide formed in the first instance meets with the soluble carbonates, sulphates, or carbonic acid present in the water, it unites with them to form carbonate of lead or sulphate of lead, and these act as a glove, protecting the metallic surface below from the further action of the water.

It may be desirable, in many cases, to ascertain whether any suspected sample of water contains this metallic impurity. Few chemical operations are easier than testing for lead. Take about a pint of the water and add to it sufficient distilled vinegar or glacial acetic acid to produce a decided acid reaction, place it in a white dish and gently evaporate over a sand-bath, or the naked flame if not too strong, until it is reduced to the bulk of one or two ounces. Then allow it to cool, and add ammonia until faintly alkaline, and then a drop of either sulphide of ammonium or aqueous solution of hydrosulphuric acid. An immediate dense black precipitate will prove conclusively the presence of some metallic impurity, which may, however, be iron. Now add nitric or hydrochloric acid until the alkaline reaction

is removed, and if the black colour instantly disappears it may be considered that no lead is present, whilst, if no change is produced, it may be considered as tolerably certain evidence that this metal is an impurity in the water.

Several methods have been suggested for preventing the contamination of water by lead. It has been proposed to coat the interior surface with tin, by drawing the pipe from a compound hollow cylinder of lead and tin, or by rolling the two metals together. It has also been proposed to cover the lead surface with metallic silver by galvanic precipitation. These plans will perfectly answer the desired end, provided there is no flaw in the continuity of the protecting metal. But if there is a slight scratch or abrasion, by which the surface of lead becomes exposed to the action of the water simultaneously with the adjacent tin or silver, a galvanic action is set up, and the lead is attacked and dissolved with tenfold rapidity. Even should the protecting metallic surface be of perfect continuity, a galvanic action will take place at the joints where solder is employed, and on these accounts we cannot recommend either of these plans for the protection of lead from the solvent action of water. A much better plan has more recently been proposed. A strong solution of sulphide of sodium, prepared by boiling sulphur in soda and water, is poured into the leaden pipes or vessels which are to be protected. Heat is applied, and the warm liquid is kept in contact with the metal for about twenty minutes or half an hour. By this time, owing to the great affinity existing between sulphur and lead, the whole of the surface of the metal which has been in contact with the liquid will have become converted into a closely-adhering layer of sulphide of lead, which, being perfectly insoluble in water, and unacted on by any of the saline impurities usually present in that liquid, forms a very effectual safeguard against the contamination of water, and the danger of slow poisoning to which persons who drink soft water stored in leaden cisterns are always liable.

JOTTING FOR JANUARY.

FROM THE MENTAL SKETCH-BOOK OF A PHOTOGRAPHER'S ASSISTANT.

OLD Father Time has once more reversed his glass, and the infant breathings of a new-born year have awakened the maudlin sentimental-like animal, that has been sleeping in some seldom-visited nook in our moral natures for the space of eleven months and three-quarters. No sooner does an old year give its expiring kick, than this creature, like a lazy bear, emerges from its hidden retreat, and with cat-like stealth, stalks through bed-chambers during the still hours of midnight, and as it breathes its moral influence o'er recumbent humanity, vague feelings of remorse creep under our night caps, and penitential ideas play hide-and-seek in the secret recesses of our craniums; but ere clearly defined plans of future reform are impressed on the memory, we too frequently fall asleep, and dream our good resolves away, or perhaps in fancy see our cherished follies, like a string of sausages, suspended around the neck of that myth-like personage, whose "kreck likeness" may be seen rejoicing in all the splendour of red, white, and blue, illustrating, whilst it mystifies the anxious student of Zadkiel's Almanac for the "soft-uns." One pipe less, one tavern passed, half a dozen branches of reform duly cultivated for the space of one week, and we are so well satisfied, that resolution is feasted the remainder of the year for its remarkable firmness.

New Year is a cheerful season for diners out, everybody congratulates everybody else, who modestly return thanks in a stereotyped form; declaring the good things said of them have been widely exaggerated. Pshaw! What open purse strings at charitable feedings? Why, throbbing raptures acting on the "bumps" of self love, that vibrate sweetly when set in motion by a judicious application of a "leetle soft soap."

But what has all this to do with Photography? Just this: its votaries (whose name is legion) in common with mortals, ordinary and extraordinary, are subjected to those annual visitations, not only are their moral natures aroused, but in many instances the professional conscience is awakened, and lashes its possessor into a desperately formed determination to do something good during the ensuing summer. They will kick the bed clothes off two or three hours earlier than has been usual with them. The balmy breeze of youthful day will play gently round their homes, whilst with skilfully pointed lens, they entrap their fairy-like images that gleefully dance on bright rays of early morn. Yon shaded grove with all its delicately developed texture will blend sweetly, whilst giving force and life to the softly sunlit landscape, whose grassy carpet is adorned with gems that sparkle best when basking in the golden morning light. Already are imaginary exhibition halls hung with glowing witnesses, that prove the claims of photography to a niche in the Temple of Art to be modest and legitimate. Already is labour's reward shaped in the visionary realms of fancy, and a future press is handing down to a grateful posterity the names of men whose talents have wreathed their brows with laurels, and have caused their names to stand on the record of fame for ever.

We sincerely hope those good resolutions will outlive the winter-piercing blast, but we fear that many an additional nap will be indulged in on the strength of that bath, which should have been filtered last night, or that developer that was mixed in a dream, and will not work under such phantom conditions. Sleep on, now the morning breeze has swept the gems away. The sun stands high in the heavens, and the fairy landscape has lost its enchantment by the removal of its breadth-yielding shadows, which alone rendered the scene an object of pictorial value.

Other followers of the "black art," who shrewdly mind their P's and Q's, and have an eye for bread and butter, are dreaming of improvements in a direction that pays best, viz., portraiture. A little reflected light here, and a subdued light there; a window knocked out, and a few turn-any-way blinds put in; a screen or two, and then, shades of Sir Joshua Reynolds! look and weep o'er your fallen greatness, and — Well, and what then? Another sweet moment of dreamy slumber, a yawn, a summons for the tenth time to breakfast tardily responded to, and another battle with the troubles of a foggy bath, whilst the veiled image will appear a silent reproach for the non-performance of New Year's resolves. A resolution should be so constructed that it may be put into operation at once.

Procrastination is not only the thief of time, but it also robs the world of that which it has a right to demand from talent. The summer will be but little cared for, if preparations are not made in winter. The summer campaign is fought by arms that have been strengthened and rendered more skilful by winter drill. The husbandman makes preparation for summer harvest, whilst the ground is wrapt in the chilly sleep of Nature's night. Then, with so many examples around us, cannot photographers find something to do that will aid them when the summer sun shines above the horizon, and bids them be up and doing? Most assuredly they can. Turn to chemistry; for, of all seasons, winter is the best for replenishing the storehouse of the mind.

The mariner trusts not mechanical skill to guide him on his way o'er the bosom of the trackless ocean. But how many photographers are there who trust alone to their hands' cunning to take them safely through the mazes of a delicate chemical process, who regard the literature of their art as a sort of picture cookery-book: concocting solutions by the aid of recipes, and leaving the result of their labours to the blind operation of chance.

Chemistry should be to the photographer what navigation is to the mariner. If well studied, it will enable him, by observation, to discover his whereabouts under all the difficulties which beset his professional path, and it will impart to his labours an interest it never possessed before; in a word, it will prove a lamp to his feet, a guide to his hand, a mine

of wealth to his intellect; and, if he is a money-lover, it will add an additional weight to his purse.

In advising the study of chemistry we would not be understood as recommending a system of cramming the memory with the mysterious nomenclature and figurative system of notation—to attain a parrot-like fluency when speaking of composition and decomposition. This knowledge, though well enough in its way, is, after all, mechanical. As an illustration, visit your sculptor's studio; a workman is applying delicate chiselling to the almost finished image; you admire his skill, but in the absence of the life-giving touches which the hand of genius alone can give, your admiration is seasoned by the thought, "'Tis but a mechanical display after all."

The human mind is a wonderful structure, that may be compared to the honeycomb, in which is stored the riches of knowledge derived from study, experience, and repeated observation. It is from this storehouse we draw material for ordinary conversation; but in the secret recesses of the intellect lie hidden jewels, which we are only permitted to gaze on at privileged intervals; at those moments we become absent from self, and lose sight of the sordid rubbish that beset life's path, whilst we seek in vain for language to give vent to our feelings of rapture, or to impart to our fellow men the ideas therein contained. When studying chemical or any other science, the essence must be separated from the mechanical, for it is only by this sifting process are we enabled to obtain real knowledge. Scientific technology may be mastered in a few hours, but a clear understanding of the ideas it is intended to convey can only be secured by a long and laborious exercise of the mind, aided by the power of the perceptive faculties. The wondrous changes that are effected in the molecular arrangements of matter, the mysterious influence exercised by affinities, the nature of cohesive attraction, and the power exerted by that of gravitation—these, with a thousand other things, can only be realized by the secret working of our highest powers, that have been trained and strengthened by exercise, this knowledge each must work out for himself by the language of the mind, for no tongue can speak it, nor can the pen record it; but should the feeble remarks offered in this paper prevail on photographers to master the spirit of chemistry, what wondrous strides will their art take during the coming year. In the present jotting our object has been to amuse, and at the same time instruct. If we have succeeded in our design, in making our bow we hope to collect a few seasonable sketches, which will be tendered in our paper for February.

RESEARCHES ON POSITIVE PRINTING.

BY MM. DAVANNE AND GIRARD.

Toning.*

§ 3rd.—TONING WITH PROTOXIDE OF GOLD.

At present chemists know of but one salt containing protoxide of gold Au^2O. This salt, discovered in 1843, by MM. Fordos and Gelis, and known in commerce since that date by the name of these chemists, and as *Sel d'or*, is a double hyposulphite of gold and soda containing 4 equivalents of water, corresponding to the formula

$$(Au^2O, S^2O^2)\,(NaO, S^2O^2)^3, 4HO.$$

Usually, photographers employ this salt only in presence of an excess of ammonia or hyposulphite of soda, and it will soon be shown that this manner of proceeding is quite rational; still, we have acted differently, and occupying ourselves exclusively in this part of our task with the theory of toning, we have, on the contrary, taken care to remove every foreign agent from the salt proper, and operated simply with an aqueous solution of hyposulphite of gold and crystallized soda.

The following table contains the results obtained; but we must observe that it is not between three equivalents of silver and two equivalents of gold, but between a single equivalent of silver and two equivalents of gold that the reaction of toning is effected in this case, and, consequently, the proportion of silver removed by the substitution must be theoretically equal to Ag=108 for Au^2=196. It is, in fact, according to this hypothesis that we have made our calculations.

Toning after Fixing.

Proofs upon Paper simply Albumenized.

Time of Exposure.	Numerical Order.	Numerical Results.	Results of the Experiments.
2 Hours.	No. 33. Portion not toned.	Grains. Ag ..... 0·110	0 gr. ·07 of gold (Au^2) equivalent to 0·004 of silver (Ag), the toned portion (No. 34) should contain 0·110 − 0·064 = 0·106 of this metal; but experiment gave 0·092; in this case, therefore, the proportion of silver ..... 0·014 deficit.
	No. 34. Toned portion.	Ag ..... 0·092 Au ..... 0·007 Ag + Au 0·099	
15 Minutes.	No. 35. Portion not toned.	Ag ..... 0·061	0 gr. ·006 of gold equivalent to 0·003 of silver, the toned portion (No. 36) should contain 0·061 − 0·003 = 0·058 of this metal; but experiment gave 0·042; in this case, therefore, the proportion of silver ..... 0·016 deficit.
	No. 36. Toned portion.	Ag ..... 0·042 Au ..... 0·006 Ag + Au 0·048	

Proofs upon Paper Salted only.

2 Hours.	No. 37. Portion not toned.	Ag ..... 0·287	0 gr. ·017 of gold equivalent to 0·010 of silver, the toned portion (No. 38) should contain 0·287 − 0·010 = 0·279 of this metal; but experiment gave 0·273; in this case, therefore, the proportion of silver is ..... 0·004 deficit.
	No 38. Toned portion.	Ag ..... 0·273 Au ..... 0·017 Ag + Au 0·290	
15 Minutes.	No. 39. Portion not toned.	Ag ..... 0·098	0 gr. ·011 of gold equivalent to 0·006 of silver, the toned portion (No. 40) should contain 0·098 − 0·006 = 0·092 of this metal; but experiment gave 0·092; in this case, therefore, the proportion of silver is absolutely ....., exact.
	No. 40. Toned portion.	Ag ..... 0·092 Au ..... 0·011 Ag + Au 0·103	

Inspection of the preceding numbers shows a great difference between the results obtained upon albumenized paper and those obtained upon salted paper. In fact, while the latter exhibit a remarkable accuracy in the atomic relations of the substitution of the gold for the silver, the former show us that the toning of the albumeno-argentic matter takes place only at the expense of a very notable loss of silver. These results remain absolutely inexplicable to us, and except the concordance manifested between the four essays, No. 33 and 34 on the one part, and 35 and 36 on the other, we must refuse to admit them. It is possible that they are due to some error in analysis, explicable by the small quantities of gold deposited; or rather, they may be due to a solvent action exercised by the hydro-sulphite of soda of the double salt upon the albumeno-argentic matter. We have found it impossible to decide, and therefore have avoided drawing a plausible conclusion from the essays in toning made with MM. Fordos and Gelis's salt, after fixing, upon paper simply albumenized. But with the essays performed upon paper simply salted it was different; these show, in the clearest manner, that in the case where the toning takes place by protoxide of gold, every accessory

* Continued from page 8.

phenomenon being laid aside, the substitution of the gold for the silver takes place regularly in the proportion of $Au^2 = 196$ for $Ag = 108$.

Toning before Fixing.

Proofs upon Paper simply Albumenized.

Time of Exposure.	Numerical Order.	Numerical Results.	Results of the Experiments.
2 Hours.	No. 41. Portion not toned.	Ag ..... 0·112	0 gr. ·008 of gold (Au2) equivalent to 0·004 of silver (Ag), the toned portion (No. 42) should contain 0·112 − 0·004 = 0·108 of this metal; now experiment gave 0·142; in this case, therefore, we find the proportion of silver ..... 0·034 excess.
	No. 42. Toned portion.	Ag ..... 0·142 Au ..... 0·008 Ag + Au 0·150	
15 Minutes.	No. 43. Portion not toned.	Ag ..... 0·064	0 gr. ·008 of gold equivalent to 0·004 of silver, the toned portion (No. 44) should contain 0·064 − 0·004 = 0·060 of this metal; now experiment gave 0·067; in this case, therefore, we find the proportion of silver ..... 0·007 excess.
	No. 44. Toned portion.	Ag ..... 0·067 Au ..... 0·008 Ag + Au 0·075	

Proofs upon Paper Salted only.

2 Hours.	No. 45. Portion not toned.	Ag ..... 0·194	0 gr. ·027 of gold equivalent to 0·015 of silver, the toned portion (No. 46) should contain 0·194 − 0·015 = 0·179 of this metal; but experiment gave 0·214; in this case, therefore, the proportion of silver is ..... 0·035 excess.
	No. 46. Toned portion.	Ag ..... 0·214 Au ..... 0·027 Ag + Au 0·241	
15 Minutes.	No. 47. Portion not toned.	Ag ..... 0·086	0 gr. ·020 of gold equivalent to 0·011 of silver, the toned portion (No. 48) should contain 0·086 − 0·011 = 0·075 of that metal; now experiment gave 0·106; in this case, therefore, we find the proportion of silver to be ..... 0·031 excess
	No. 48. Toned portion.	Ag ..... 0·106 Au ..... 0·020 Ag + Au 0·126	

The results to which the study of toning with the protoxide of gold before fixing lead, present great concordance with each other, but appear very surprising at first sight. For we not only find the proportion of silver *always in excess*, as we have already observed in neutral toning before fixing, but this excess becomes so considerable that the toned proof always contains more silver, independently of the gold which is deposited, than a similar proof not toned. This fact may be explained by saying that in the case under consideration, not only in some gold deposited upon the proof, but also a portion of the argentiferous compounds the latter contains, becomes insoluble in the fixing solutions. However abnormal it may appear, this fact may still be explained when we consider the state of the proof and the composition of the toning agent with which it is put in contact.

This proof is, in fact, not fixed—it has been simply washed in water, and still contains, besides the mass of chloride of silver with which it is impregnated, a notable proportion of nitrate of silver adhering to the fibres, as in the operation of dyeing, and which the washing has not removed from it. Now, every equivalent of hyposulphite of gold and soda decomposed sets at liberty 3 equivalents of hyposulphite of soda; and this latter, in presence of this excess of salts of silver gives birth to the double hyposulphite of soda and silver, formed of equal equivalents,

$$Ag\ O\ S^2O^2,\ Na\ O\ S^2O^2,$$

which, especially in the light, rapidly decomposes, giving off sulphide of silver: hence the great excess of this metal which we have constantly recognized.

Photographic practice has, since its origin, protected the proofs from this abnormal deposit of silver; it is arrived at by employing MM. Fordos and Gelis's double salt only in presence of on excess of ammonia or hyposulphite of soda. The results change then, for the quantity of the fixing solution present during the toning is more than sufficient to form the double hyposulphite of silver and soda,

$$Ag\ O\ S^2\ O^2,\ 2\ Na\ O\ S^2\ O^2,$$

which, being soluble and stable especially in presence of an excess of the solvent, does not lead to the formation of sulphide of silver. From all that precedes, it results that in the single case where we have been able to obs rve the toning with hyposulphite of gold and soda, protected from every cause susceptible of modifying it, the substitution of gold for silver takes place atomically, as in other processes.

Employed under the conditions in which we have intentionally placed them, that is to say, without the addition of an excess of the fixing solution, the double hyposulphite of gold and soda gives an irregular toning. This may be easily understood upon reflecting that the double hyposulphite and silver produced by the decomposition is insoluble in water, and by depositing itself upon the portions to be toned, isolates them from the toning agent. This fact becomes very evident when we observe the feeble quantities of gold deposited by this mode of toning, and then compare them, by means of the preceding tables, with the quantities deposited by other processes.

It is only in presence of an excess of ammonia, or of hyposulphite of soda, that the *sel d'or* gives good results; it then acts with uniformity, and enters into the class of tonings termed alkaline, the study of which we have undertaken.—*Bulletin de la Société de Photographie.*

GLASS ROOMS WITH SOUTH LIGHT.

The Editor of the American *Journal of Photography* calls the attention of photographers to the advantages in point of rapidity to be gained by the use of a studio with southern aspect, so as to secure direct sunlight on the sitter. The light is, however, to be filtered through blue glass, and is stated to enable the operator to produce portrait negatives in a fraction of a second. Mr. Bogardus, of Broadway, has constructed such a room, which is thus described:—

The light fronts the south. This is the capital fact about it Of course we know it is not the first light which has been made to face the south. But we believe it to be the first that was deliberately and designedly so constructed, a southern aspect being preferred to any other. The top light is fourteen feet square; the bottom or side light, meeting the top light, is ten feet high and fourteen feet wide. The upper edge of the top light is fifteen feet from the floor. The top light has, it will be seen, a pitch of about twenty degrees. The glass of these lights is the ordinary white ground glass; but the glazing is double, and we have only described the outside. Six inches within and parallel to the ground glass are sashes glazed with blue glass. There are four sashes for the bottom light, sliding lightly on rollers. The operation of the whole contrivance is this; the pure sunlight easily gets through the ground glass, but the rays are diffused and softened; these diffused rays meet the ground glass, and everything in them which is not wanted is held back, and only the uncontaminated chemical force passes down into the room.

Mr. E. M. Howell, late of Fredricks, the skilful manager of the camera, told us that he found it best to make his sitters face the sun, and accordingly the position of the background was constantly changed during the day to secure that desideratum. A wonderfully small stop on bright days is used in the camera, and fifteen seconds are considered a long time for exposure. On such days, with lens at full aperture, the sitting is less than one second.

In another number the Editor makes the following comments on the subject:—

The grand problem in photographic portraiture for the past twenty years has been, how to make a photograph with the shortest exposure of the model. The attempts at solution are in two different directions, viz., the concentration of light, and the employment of more sensitive chemicals. The early photographers were wonderfully successful, by virtue of the working in the open air, chalking of faces, using of reflectors, camera lenses and mirrors of large aperture, screens of blue glass, and troughs of the ammonia sulphate of copper, &c.; and all this with the slow process which Daguerre gave to the world. The success was so great that photography would still be a practical art, even had there been no improvement in the chemical department. But the capital discovery of the quickening action of bromine was made, and we were at first so well content with our comparatively quick working that we abandoned our special appliances for the concentration of light. There were then no very notable improvements in either direction for ten years. The Daguerreotype was substantially perfected in 1841. In 1851, Archer gave us the collodion process, and it remains still, in respect of sensitiveness, but little better than when we received it. We feel vexed that we have so little to show for the last ten years; if all sympathize with us, and a great many shoulders are put to the wheel, something may be done speedily.

Surely we can improve our practice with regard to lighting. Let it well be appreciated that the chemical process remaining the same, the time of exposure is rigidly proportioned to the amount of light. If it now requires ten seconds of exposure for a negative, and a babe can remain still but five seconds, you have only to get twice as much light and your negative is made in five seconds. All artists of course understand that by removing the stops from the lenses, the light is proportionally increased, but at the extravagant expense of definition; this plan should not be resorted to, therefore, except when other expedients are unavailable. Increase the light falling on the model, should be the maxim. In direct sunlight portraits are made almost instantaneously; this is a capital fact,—but how to make it serviceable is the question. Let this direct sunlight be filtered through a pure blue medium and you eliminate everything which is obnoxious, while the unadulterated actinic force is left to do its work. Light is wanted, the more the better; then give it a chance to enter. Skylight facing the north, expressly to avoid the beaming face of our best friend is unkind and absurd. These thoughts are reasonable, and they are not an untried theory. Mr. Bogardus has lately constructed a camera room, which we propose to the profession as a model, where the correctness of the system of direct sun-lighting is demonstrated: the light looks towards the south, the sitter in a mild twilight is face to face with the sun; Mr. Bogardus often gets the very best negatives in a fraction of a second.

THE MICROGRAPH.

BY COL. N. PIKE.*

THESE minute and beautiful pictures are truly wonderful specimens of art. It is only a few years since they were introduced to the photographic public. We believe that M. Dagron, of Paris, was the first to make them successfully; we have seen of his productions a number of portraits grouped together on the same plate, covering a space altogether no larger than a pin's head, though the features were delineated with all the accuracy of the ordinary photograph. We regret to see that there has been indicated in this field of inquiry a spirit of monopoly and secrecy, injurious to science, and totally at variance with the liberal and unselfish spirit which has hitherto marked—to his honour be it spoken—the student of nature.

As I have been very successful myself in making these pictures, I will give, as briefly as possible, the formulæ, and a description of the instrument by which they are made:—

First, a camera should be constructed about two feet long and six inches square, and accurately mounted on a strong adjustable table-stand. This camera-box should have three openings across the top for the slide or holder of the picture to be reduced; these openings, which admit of three different-sized pictures, should be: the first one just 11 inches, the second 15 inches, and the third 19 inches from the back of the camera. The end of the camera holding the slide upon which the picture is to be taken should be covered with a square piece of thin board, fitting tightly in a groove, in the centre of which is a small aperture, about one-sixteenth of an inch in diameter; on the inner side of this board is fastened a tube or socket, about an inch long, into which the lens tube fits and slides, the aperture being in a line with its focus. To place and adjust the lens tube, a small door is made on one side near the end of the box. The platcholder fits and slides close to this diaphragm; it is arranged with a hook or pin which corresponds with a series of holes in a brass plate on the top of the camera; these are termed indicators; the slide is held in its place by a spring arranged on the bottom and end of the box. After the size of the photograph is determined upon, the focus is adjusted by aid of a microscope; the ordinary inch power is all that is required for this purpose; both instruments—microscope and camera—should be placed on a stationary table and be *perfectly level.*

The glass used to focus upon should be microscopic glass, such as is used to mount microscopic objects, but it should be prepared in the following manner:

First dissolve gum dammar in alcohol by heat; let this solution become cold, when it will be found to have deposited part of the gum insoluble in alcohol; the clear solution is to be poured off and mixed with about an equal part of plain collodion; this should be shaken until it is well mixed, then add as much alcohol as upon trial will give, when dry, the strength of opacity required. For micrographs nothing can equal it as a focussing glass. This solution should be applied to the glass plate in the same manner as you apply collodion.

This glass is applied directly against the opening in the diaphragm, and the object glass of the microscope is brought directly against it; the correct focus is then obtained by the rack and pinion movement of the camera. It is always best to have the light of the bright blue sky reflected through the negative, which is placed in the slide in the opening, as the action of the light on the collodion surface is more uniform than when artificial or oblique rays of light are employed. The glass which I use for these pictures is a very thin microscopic glass of English make; the plates are three inches in length by one inch in width; large plates could be used, but it is not necessary, for upon one of these plates sixty-four pictures have been made. The collodion used is made as follows:

Sulphuric ether	2 ounces.
Alcohol	2 „
Iodide of potassium	37 grains.
Bromide of cadmium	11 „

First grind to an impalpable powder the iodide of potassium, then add the alcohol; triturate the whole until the potassium is all dissolved; then add the bromide of cadmium, and, when this is dissolved, add the sulphuric ether and pyroxyline enough to make it the consistency of collodion; then add 1½ oz. of alcohol; shake it well, and let it stand a week or ten days; syphon it off into a collodion phial, and it is ready for use. The pyroxyline should be of the powdery kind, and made at a high temperature of the acids; it is well to make the pyroxyline expressly for this purpose. If the collodion is made properly, it will give a structureless film, and answers admirably. The silver bath used should be 40 grains to the ounce, and acidified with nitric acid, about two drops of the former to one of the latter. The exposure varies according to circumstances, which the operator must determine by practice alone. The pictures are developed with the ordinary iron developer and fixed with cyanide of potassium, well washed and dried, and they are ready for mounting. They are then cut into small squares, and mounted on a glass cylinder, about an eight of an inch in diameter; one end of the cylinder is plain, and to this the

* From *Humphrey's Journal.*

photograph is cemented with Canada balsam, similar to the manner in which microscopic objects are mounted. The opposite end of the cylinder is ground convex, making it a magnifying lens. When the balsam is dry, the glass is trimmed with a pencil diamond; they are then ready to be enclosed in an ivory tube. The glasses can be manufactured from glass rods, sold for the purpose, by cutting them to the proper lengths, and melting the end of the cylinder with a burning lens. The heat of a burning lens is uniform, and there are no injurious products of combustion as when a flame is employed.

Mr. Fitz, the celebrated telescope manufacturer, has employed the burning lens in his practice with marked success. They are also made with a grinding tool a diamond made concave, which is mounted and revolved under water, and the glass rod is melted against it. These lenses may, however, be furnished by almost any of the opticians in New York.

THE ALLEGED EARLY PHOTOGRAPHS.

WE subjoin extracts from various letters addressed to Dr. Diamond, and read at the last meeting of the Photographic Society, relating to the alleged early photographs. Prior to giving them, however, we reproduce an extract from a letter addressed to the Editor of the *Illustrated News*, who writes as follows:—

Our correspondent in this instance is Dr. Henry Lee, of Weatheroak, Alvechurch, Worcestershire, a gentleman born near Birmingham, January, 1793, and resident in Birmingham in 1816-23. The dates, the reader will please observe, are of the greatest importance, and the whole evidence of this correspondence is so weighty, that we give it almost *in extenso*. "In confirmation," writes, then, Dr. Lee, "of the statement made by the old man formerly in the employ of Matthew Boulton, Esq., I very well remember having heard, many years ago, from my mother, many of the particulars, which leave me no doubt of the truth of his statement. I have heard her say that a society used to make trial at Soho, to produce visible representations of objects by means of sunlight, which they called sun-pictures; that Mr. Francis Eginton, who lived on Soho Hill, in the near neighbourhood of Mr. Boulton, was said to be the inventor of the process, or to be acquainted with it; that a camera was used, and that a silver plate was, at least, sometimes employed; that, when Mr. Boulton's house was to be repaired, a representation of the house was so taken; that many representations by the sunlight process were made and sold, and so dispersed; and that, from a fear of injury to living artists, the process was discontinued, being said to have not arrived at the perfection once hoped for. My father and mother were acquainted with several members of the Lunar Society. My father hung in his parlour an engraved portrait of Mr. Boulton, no less as a memorial of a friend than of a public benefactor. My mother continued to visit his daughter, who long survived him. I recognize in the old man's story my mother's statements, which, having been more than once repeated to myself, I clearly remember. My mother came to Birmingham in 1788, and resided in that neighbourhood till her death, in 1832. I have been with her at Mr. Eginton's, and have heard from her anecdotes which he had told her. I have no doubt her information was derived from authentic sources."

LETTER FROM MR. FAIRHOLT.

"24, Montpelier Square, Brompton, Nov. 26, 1863."

"DEAR DR. DIAMOND,—I have examined with great attention, and much interest, the copies of pictures in the possession of Mr. Smith, which came from Boulton's factory. That they are produced by mechanical means, and not by hand-labour, is very certain; for the duplicates have an exactness no copy could effect. Yet they do not appear to be engravings, for there is no trace of any of the usual modes adopted by engravers, to produce such tinted copies of drawings, as these are. Nor are there any traces of the ordinary modes of engraving in any of them, such as mezzotint, aqua-tint, &c., which might produce somewhat similar appearances—but a magnifying-glass would then show a grained or engraved surface which never appears on these. It is also very remarkable that, whether in simple tints or in colours, they lie, as it were, on the surface of the paper; they do not sink in as printing ink or colour would do if engraving or ordinary colouring had been adopted. A damp finger will wipe into a muddy mass the colour or tint upon them, and leave unstained paper below.

"Mr. Smith, when remarking how cheaply they seem to have been fabricated, observed, that to copy the duplicate he possesses would be a very troublesome and expensive work. I at once and emphatically replied that it would be *simply* IMPOSSIBLE for anyone to copy in every minute touch such a work as that. As you know, I have all my life been employed in making facsimiles of old art-works, and I am sure of this.

"How they were done is a lost secret. I never saw anything like them. If the monochromes had been shown to me, without their history being told, I should have said they were photographs.

"As regards the silver plates with views of Soho upon them, you are more competent to decide upon them than I am. Surely, they tell their own tale, what can they be but sun-pictures?—I am, dear Dr. Diamond, yours very truly,

"F. W. FAIRHOLT.

"P. S.—I am off to Egypt to-morrow, or would come to your society meeting, I feel so much interested in this anxious subject. Of course, I place myself in your hands, and you can do what you think best with this note."

LETTER FROM MR. ROBERT HUNT.

"Museum of Practical Geology, Jermyn St.,
"Nov. 23, 1863.

"DEAR DR. DIAMOND,—I feel assured that you will not deem any remarks of mine obtrusive—when they relate to a subject of so much interest as the history of the discovery of photography. I believe no one has looked more closely into the early story of the *art* than I have done, or acquired a more perfect knowledge of the *science* of photography. By the courtesy of Mr. Smith, I have on two different occasions very carefully examined the alleged photographs. Being in Cornwall, I could not attend the meeting of the Society, but I have most carefully read the report of the proceedings of that interesting evening in the *Photographic Journal*.

"My convictions are—That the paper pictures are not photographs. My reasons are,—

"1st. The pictures show none of those inequalities which would result had they been copied by means of the camera obscura from *oil-paintings*. I mean inequalities due to the variations of chemical force in the radiations from surfaces of different colours.

"2ndly. They show none of the lines of an engraving, which they would have done had they been copied from prints, either by the use of the camera, or by superposition.

3rdly. The colouring matter of the pictures is superficial, and easily removed from the paper: consequently, this is conclusive, that no chemical change has been effected upon any composition applied to the paper.

"4thly. In a copy of one of Angelica Kauffman's pictures, *one figure has been omitted*. This would not be the case if any photographic process had been employed.

"I do not think it is difficult to indicate the process employed by Eginton to produce those pictures; but my only point at present is to indicate to you *such objections* as present themselves to my mind.

"The pictures on metals are beyond all question, photographs. The only one on which any judgment can be passed, is evidently obtained on a *surface of resin*: I believe the resin of the essential oil of lavender. This can easily be determined by examination.

"If it can be proved that this plate gives a view of Soho House prior to 1791, all discussion is at an end. I think it probable that the plate may be one of those produced by Niepcè between 1814 and 1828. We know that Niepcè gave pictures to Mr. Baner, who left them to Mr. Robert Brown, and these are now in the hands of J. J. Bennett, Esq., of the British Museum. A very recent examination of those pictures certainly strengthens my conviction, that Mr. Smith's photograph has been derived from this source.

"It is quite certain (see Wedgwood and Davy's memoir in my 'Researches on Light') that Wedgwood, prior to 1802, used the camera obscura. They say, "The images formed by means of a camera obscura, have been found too faint to produce in any moderate time an effect upon nitrate of silver." However, everything must turn on the question—Is the view one of *old* Soho House? This settled, nothing remains except to give

Boulton or Eginton the credit of being acquainted with photography prior to Charles, or Wedgwood, or Davy, or Niepcè.

"Pardon my troubling you with these remarks. I am interested in settling this question; and Mr. Smith should receive the highest praise for the zealous and honest course which he has adopted in his attempts to reach the truth.—I am, dear Dr. Diamond, most truly yours, "Robert Hunt."

Letter from Mr. Smith.

"29th Dec., 1863.

"My dear Sir,—I am of opinion, as well as several of my friends, that it will be far better to postpone a further discussion of the Sun Picture Question until I have been to Heathfield. I have seen Mr. Gibson Watt, who has kindly promised to name an early day for meeting me there, and to examine the Watt relic room.

"I have the following from Mr. Henshugh Wedgewood.

"A letter from Mr. James Watt to Josiah Wedgewood, dated Thursday only, but docketed by Josiah Wedgewood, Jan. 1790, begins as follows:—

"'Dear Sir,—I thank you for your instructions respecting the silver pictures, about which, when at home, I will make some experiments.'

"The rest of the letter relates to details of a mill at Etruria.

"Yours truly, "F. P. Smith."

"31st Dec., 1863.

Dear Sir,—"A grandson of Wedgewood was with me yesterday, to show me the original of Watt's letter to Wedgewood, and to correct the date from 1790 to 1799.

"He has a *lot of letters between Watt and Wedgewood*, and is going to look through them. Its just possible he may find others, showing the results of the experiments which Watt says he will make when at home.

"1791, as the date of the alteration of Boulton's house, is almost an imaginary one; given, as Price says, by Miss Wilkinson, it may as reasonably be 1799, or even later, in fact, soon after the date of Watt's letter to Wedgewood.

"Mr. Wedgewood *sayeth* further, that he shall be able to show that one Daguerre was agent in Paris for Wedgewood, to sell cameos and other things manufactured at Etruria. As *yet*, he can't say whether it was the Photographer Daguerre, or his father, or any other relative.—Yours truly,

"F. P. Smith."

Letter from Rev. R. C. Pole

"Radbone Rect., Derby. Nov. 17th, 1863.

"Sir,—Having read in the 'Saturday Review' an article upon Photography, in which it is stated that there is no "clue as to the original method of the production," I will state a fact, but without comment.

"When I was a child, I well remember two pictures about 14 inches square, said to have been done by electricity by Dr. Darwin, who was my godfather, and died 1800. But the word electricity in the mouth of a nurse may not be very definite.

"It is now about fifty years since I saw them, and from what I recollect of them they would be experiments, and were pleasing to look at from their colours. They were not landscapes, nor were they copies of anything. Dr. Darwin was a personal friend of Boulton.

"This slight record of something that did once exist, and how effected, may assist you in your investigation of this subject, which is my reason for troubling you with these few lines.—I remain, Sir, yours truly, "Reg. Chandos Pole."

Letters from Mr. M. P. W. Boulton.

"Sir,—I send you the dimensions of the oil pictures in my possession, formerly at Soho House, which were always reputed to be specimens of the secret process of copying pictures formerly practised at Soho.

	Height. Ft.	In.	Width. Ft.	In.
Rinaldo and Armida .... (*Angelica Kauffman.*)	4	1	3	3
Offering of Wise Men .... (*West.*)	3	3⅝	4	1⅝
3 pictures of Faith, Hope, and Charity..... .....*each* (*Sir Joshua Reynolds.*)	4	1	1	5⅜

"These dimensions are those of the canvas in sight, clear of the frame.

"I remember, also, a large picture, formerly damaged, and now, perhaps, destroyed, Isaac blessing Jacob, copied from Rembrandt, the dimensions of which, to the best of my recollection, were about 4 feet in height by 6 in length.

"The portrait of my grandfather, by Sir W. Beechey, is in my possession, at Tew Park. This picture was engraved by Sharpe.

"Mr. Hodgson, in a letter I have just received from him, gives 1806 as the date from which he has a distinct recollection of Soho House.

"The lady who spoke of Miss Wilkinson taking sun-pictures on the lawn in front of Soho House, is the daughter of Mr. Hodgson. Unless her statement concerning the early date of this occurrence is confirmed by other evidence, I should be inclined to regard it as a mistake.

"I never heard till quite recently of Miss Wilkinson practising photography in any way before the time at which the process was known to the public; and it would require clear and strong evidence to make me believe it.

"I am, Sir, yr. obedt. Servt.,

"M. P. W. Boulton."

"Dec. 12.

"Sir,—Concerning the process of copying pictures at Soho, I may state that I recently conversed on the subject with J. Hodgson, Esq., F.R.S., of 60, Westbourne Terrace. Mr. Hodgson was formerly resident at Birmingham, where he acquired high repute as a surgeon. He was an intimate friend of my father. He recollects the oil pictures now in my possession, and states that my father spoke of them as pictures produced by sun-light; but does not remember anything further said as to the method of their production. Mr. Hodgson states that he recollects Sion House from the commencement of the present century, and is confident that the alteration in it was not made subsequently to that date.

"In my printed remarks I gave a caution as to the dependence to be placed on Price's evidence.—I remain, Sir, your obedient servant, "M. P. W. Boulton."

"Dec. 28, 1863.

"Sir,—In a letter I have just received from Mr. Stockdale, he speaks of the photographs sent to Mr. Smith as taken by Miss Wilkinson *twenty years* ago.

"I think, therefore, there has been a mistake on this point.

"My belief is that Miss Wilkinson did not practise photography before the time at which the process was made public, and that the statements assigning an earlier date to her practice of it are mistakes.

"It is certain that Miss Wilkinson did practise photography to some extent subsequent to 1840, but, so far as I can make out, not to any great extent.

"I send you an extract from Mr. Stockdale's letter.—I am, Sir, your obedient servant,

"M. P. W. Boulton."

Extract from Mr. Stockdale's Letter.

"My sister called to mind her visit to Soho, in 1818, and of the use she then made, at the suggestion of your father, of the 'camera,' and my medical attendant (a scientific man) being in the house, undertook to communicate with Mr. Smith, and to forward to him two views of Soho, taken with the aid of this very camera. My sister also gave him two sun-pictures which our cousin, Miss Wilkinson, took at Carke, about twenty years ago, with what Miss W. called a 'Helioscope.' When we first saw the account of these sun-pictures, in the *Saturday Review*, and *before* seeing Mr. Price's description of *the camera*, my sister gave a perfect description of it, exactly such as Mr. Price has given, and a sketch was sent up along with the two sketches of Soho House, to Mr. Smith by my medical attendant. My sister says, whilst she was at Soho, the library was *not* shut up. The camera was either made of oak or mahogany, and seemed to be *old*, with little or no ornament – made for use only. . . . My sister says Miss Wilkinson was continually making use of the camera."

"24, Essex Street, Strand.

"Nov. 28th, 1864.

"My Dear Sir,—I think you know that my father, Mr. Robert Cole, has a large collection of autograph papers. He has brought to me out of it a letter from Matthew Boulton to Col. Watson, in India, telling of the fifty new steam engines, and of their many practical applications; and then of 'a new method of copying letters,' of which Boulton gives details, and adds, 'we

also copy all our engine drawings upon thick paper, in which case the drawing is reversed, and is so perfect as not to be distinguished from ye original. We make some rolls 2 feet long for the purpose of copying architecture and other large drawings.'

"A transfer of his own letter is found enclosed. It has the water mark 'J. Watt and Co., Patent Copying.'—The specification for the patent is dated in May, 1780. The materials for the ink and the paper and the mention of substances 'capable of turning black or deep coloured with solution of iron' are very suggestive.

"The letter to Col. Watson is dated February, 1781. In July of the same year, Egintoun says, 'the print is ready for transferring;' and in August Hodges sends 'two blanks for painting upon.'

"Whatever was the nature of the negative, here, apparently, is a machine with materials fit for making the transfers, and blanks for the so-called 'mechanical paintings.'

"As there are great difficulties in the way of believing that the supposed photographs were taken direct from paintings, not only as regards the colours of the originals, but the drawing of the prints, it is suggested that, from a mezzotint (perhaps purposely made), copies reversed were obtained by pressure in the new machine: either a few full-bodied or 'dead colour,' as sometimes ordered, or several lightly printed as transfers or blanks for painting, on paper or canvas prepared as directed in the patent specifications.

"I believe that the two impressions of Penelope and Calypso, ordered by Hodges to be transferred to copper plates, were for wall panelling. They seem to have been 10″+8° oval, such as are seen in old carved chimney pieces and cornices.

"I am, my Dear Sir,

"Yours truly,

"John J. Cole."

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, January 13th, 1864.

In studying from a theoretical point of view the part played by the various substances known as *preservative* agents to the collodion film, the long array of which is as amusing as it is formidable, M. Poitevin has arrived at conclusions as original as they are interesting, and upon him devolves the honour of dispelling the mist with which the subject was enveloped. M. Poitevin's process will act like Aaron's rod in swallowing up all other methods and processes for the attainment of that photographer's ideal—dry collodion. The importance of his discovery was not fully appreciated upon its first announcement, but the more we reflect upon it the more important and useful it appears.

Let us consider the state of the question of dry collodion up to the date of the publication of M. Poitevin's discovery. We find that—contrary to what takes place in the processes with silver plate, albumen, and waxed paper—collodion could not be employed in a dry state, because washed iodide of silver is almost insensitive to light. And although the presence of nitrate of silver imparted sensitiveness, it could not be allowed to remain on the iodized collodion film, since, becoming concentrated by evaporation, it dissolved the iodide, and formed crystals. Hence arose that cloud of preservers, and the process in which the sensitized collodion film was washed, and afterwards covered with one or another of uncrystallizable or deliquescent substances, calculated to prevent the film from becoming dry; but it cannot be said that any one of them was wholly successful.

The first successful dry process was Taupenot's, subsequently modified and improved by various eminent operators; but this was an albumen rather than a collodion process, inasmuch as it was an uncrystallizable combination of albumen with nitrate of silver that constituted the dry film.

The suggestion made by M. l'Abbé Desprats, of adding rosin to collodion, to work in the dry state, was good, and tolerably successful, although it was never much practised.

Dry collodion made but little further progress until Major Russell introduced his "tannin process," on the assumed principle that any collodion available in the wet state would retain its sensitiveness in the dry state, if the film were washed and covered with solution of tannin, as a preserver. But now that M. Poitevin has shown that tannin is not so much a preserver as a sensitizer, that a sensitized plate rendered insensitive by washing away the nitrate of silver, may be rendered sensitive again by an aqueous or alcoholic solution of tannin; and as the tannin does not dissolve the iodide of silver in the film as the nitrate does, it may be left to dry upon the plate without prejudice.

There is this difference, however, in the action of tannin and nitrate of silver, if the latter be washed off, the film loses its sensitiveness, but iodide of silver rendered sensitive by the action of tannin, retains its sensitiveness after the tannin is removed.

M. Poitevin's process has no resemblance, in a theoretical point of view, to Major Russell's; and it is even more original, probably, than its author imagined. If the photographer can dispense with the nitrate of silver bath for sensitizing his collodioned plates, there can be no doubt that he will at the same time get rid of nine-tenths of the causes of failure in wet collodion, and also attain to a dry process, which possesses the advantage of providing any quantity of dry plates, absolutely insensitive to light; or, if desired, the dry plates may be kept in store ready sensitized by tannin.

M. Poitevin, however, does not yet propose dispensing with the nitrate bath, but to sensitize the plates in the usual manner, then wash off the nitrate as completely as possible; but as some always remains in the film, to convert it into iodide by pouring over it a solution of iodide of potassium of 4 per 100 strength, previously saturated with iodide of silver, we then have a collodioned plate quite insensitive to light under ordinary circumstances.

M. Poitevin's new process is well calculated to make us think that the photographer's millennium has arrived, or, at least, is very nigh—no more spots, streaks, comets, pinholes, or fog!—the nitrate bath has been to the photographer what the Old Man of the Mountain was to Sinbad the Sailor: it was a Bottle Imp—a demon that could not be subdued; if all the oaths uttered over the nitrate bath are registered, the book in which they are inscribed must consist of leaves as large as Salisbury Plain; if we *can* do without it, all will say "Amen" to "a good riddance!"

The committee appointed by the *Académie des Sciences*, consisting of three of our most eminent savants, has reported on M. Vial's new processes for engraving, which are, certainly, among the most remarkable applications of science known. To think that a line engraving can be produced on a steel plate, complete and perfect as from the hands of the most skilful engraver, within ten minutes after it leaves the draughtsman's hands, is to believe that the limits of possibility are over-passed, and yet this is no more than M. Vial did in the presence of a full meeting of the members of the *Académie*. Never was a subject received with more favour, or excited a stronger interest. The sitting was completely interrupted and suspended; the most eminent members stood up in their places in the amphitheatre, watching with the liveliest interest the experiments performed under their own eyes, by M. Vial. It was anxiously inquired if a process so rapid and efficacious would not be the ruin of artists who engrave by the old methods; we answer, that M. Vial's processes only supersede the mechanical portion of engraving; it *copies* and *bites*, but it does not design or originate: the artist's hand, directed by genius, is as indispensable as before. M. Vial's processes possess remarkable originality and ingenuity, and cannot but possess the deepest interest to the photographer, who may reasonably hope, by its aid, to convert his collodion negatives into engraved steel plates; we are certainly on the eve of the perfecting photographic engraving, as Mr. Dallas's plate of "Kenilworth Castle" forcibly indicates.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

Dear Sir,—I shall feel much obliged if you would correct in the News an error which has crept into the Almanac for 1864. It is there stated that the meetings of the "Blackheath Photographic Society are suspended." This is no longer the case. At the end of last season the society amalgamated with the West Kent Microscopical and Natural History Society, and the meetings of the joint societies take place regularly every month at the rooms connected with the Missionary School, Blackheath. In November the society gave a soirée, at which a number of very fine photographs were exhibited in addition to microscopes and objects of natural history. At the ordinary meeting in December, a paper was read on "A New Rapid Dry Process," and at our next meeting I believe we shall also have a photographic paper.

By inserting this you will greatly oblige yours truly,

Chas. Heisch.

Late President of the Blackheath Photographic Society.

[We have much pleasure in noting the re-vivification of a society in the former proceedings of which we always took especial interest. We regret that we had not an intimation of the amalgamation earlier, in order that it might have been duly set forth in its proper place in our Year-Book. We hope in future to be able to give some account of its proceedings.—Ed.]

Photographic Notes and Queries.

Side Light and Front Light.

My Dear Sir,—Through an error in printing, the late communication I addressed to you appears without meaning. I said that "front," "side," and "side-front" light was the question in dispute, and not as it is printed, a compound word, "front-side," &c. Also, the reading of the addenda should be, "I enclose a portrait or two taken with the light on the sitters, *as I have described it; but* as I have never committed myself by using a *front-light*, I cannot send any to contrast with them." Your notice of this will oblige yours truly,

Blackheath Park, Jan. 11th, 1864. Buchanan Smith.

I thank you for the clear and unmistakeable way in which the article on "Lighting the Sitter" is worded. I cordially endorse all you have said on the subject, and hope, as you have been so carefully minute in describing it, the directions laid down will prove satisfactory to all who read it.

Nitrate of Soda.

Dear Sir,—In your last issue, "A Photographer's Assistant," in explaining the difficulties attending the experience of "A. D. E.," when using nitrate of soda in the printing bath, says: "He has (alluding to "A. D. E.") experimented with an article adulterated with carbonate of soda, whose presence is not sufficiently marked to deteriorate the better samples of paper; but on submitting a stale or inferior kind of paper, the results follow as described in his letter."

Hitherto it has been my belief that, to add carbonate of soda to a solution of silver, would have the effect of precipitating carbonate of silver; and I should imagine the only drawback would be to make the bath weaker. As I am no chemist, I shall be very glad if your correspondent will inform me how there could be free carbonate of soda in the bath at the time of floating the paper, as he describes.

I am, dear Sir,

Yours very truly,

Peckham, Jan. 11th, 1864. Alfred Harman.

[The addition of pure carbonate of soda to a solution of pure nitrate of silver would produce a precipitate of carbonate of silver. If, however, nitrate of ammonia were present, as is generally the case in printing baths, from the decomposition of chloride of ammonia, sufficient oxide or carbonate of silver might remain in solution to render the bath decidedly alkaline.—Ed.]

Effect of Acid Paste on Photographs.

Dear Sir,—In the last number of the News you referred to a letter of mine which was read at the last meeting of the Photographic Society, and you say that I called attention to the fact that "*mounting* had been the cause of *fading*" of the print in question. Now, as there was no appearance whatever of *fading* in the print, I shall be glad if you will allow me to explain what the letter really said, as the matter is of considerable importance to photographers and the public. The photograph in question was mounted in the usual way, on plate paper, and was equal in tone and quality to the one of the same subject in your own possession. The print was sent to be framed, and, for some reason which I cannot understand, the frame-maker thought it necessary to *paste* all over the back a sheet of cartridge paper, and it was this which caused the mischief. The acid of the paste seems to have penetrated the plate paper and photograph, the colour of which was changed from the rich colour we all desire to see in photographs, to a dirty brown; there is at *present* no appearance of *fading*, but, on the contrary, a deepening of the effect. No doubt, *in time*, the fading would have commenced, and the photographer would have been blamed for carelessness in his manipulations. The *sour paste* would never have been thought of, if I had not accidentally discovered the real cause of the damage to the print.—Yours very truly,

A. Brothers.

Manchester, Jan. 13, 1864.

Talk in the Studio.

Photographic Exhibition.—We are authorized to announce that an exhibition of the Photographic Society will be opened some time in the spring. It is thought that an exhibition during the London season, when everybody is in town, will afford a better opportunity of publicity than one held during the winter months. The place is not yet determined upon, but will be duly announced.

Photography and Lithography.—We have received from Mr. Bourquin some specimens of lithographed maps by a process which is, we understand, at once expeditious and cheap, and readily admits of the production of copies enlarged or reduced from the originals. We are told that the process is not photo-lithography, but rather a system of lithography so far associated with photography that it may properly be called "the illegitimate child" of that art. This phrase is M. Bourquin's. The prints have much excellence, and we shall be glad to learn something further of the process.

"The Philadelphia Photographer."—A new monthly journal devoted to photography has just appeared in Philadelphia. It contains sixteen pages octavo, and is well printed and neat in appearance. The price is thirty cents, equivalent to one shilling and threepence sterling. The first number contains a photographic copy of an engraving from one of Mulready's pictures, and we understand that the occasional distribution of photographs will be one of the features of the undertaking. We wish all success to the new publication.

Silver from Paper Clippings.—The Editor of the *American Journal of Photography* gives the following singular experience:—"We do not think it a good plan to dissolve the silver with nitric acid out of the ashes of waste silvered paper. The nitrate of silver thus made would be very inferior, containing other nitrates, and, unless care was used in burning, a great deal of organic matter. In our large experience in refining photographers' waste, we never get pure silver from ashes at the first melting. We find on an average in every 100 lbs. of paper clippings, say—one paper of pins, half pound of iron nails and tacks, assorted sizes, tin foil from three papers of tobacco, one old boot, half dozen mats and preservers, quarter pound of broken glass. It does not need any reasoning to show that the ashes from such a mass will not give up to nitric acid the silver alone. In general, the best way to treat residues is by the crucible and the regular refining process, and these should only be entrusted to men of skill as well as honesty. There are very few photographers who can economically extract silver from refuse matters, or make good nitrate from pure silver."

To Correspondents.

Ghyra.—There are a great many excellent manuals published, all suitable for beginners. Perhaps none are more simple and trustworthy than "Practical Photography on Glass and Paper," Bland and Co.; or Mr. Hughes' Manual. There are, however, at least half a dozen different manuals, all very good.

Edgar.—We will make inquiry: but we have no doubt that you will see it duly acknowledged. You do not state under what name it was sent.

W. A. D.—You can obtain the material, &c., "oxygenesis," for producing oxygen, of Garden and Robbins, Oxford Street.

EXCELSIOR.—We have found almost all the lime toning baths keep well. The one we have been using, which is still good, and has been made some months, simply consists of three grains of chloride of lime, two grains of chloride of gold, and ten ounces of water. For details of formulæ, mode of using and keeping qualities, see article on the subject in our YEAR-BOOK just issued.

A BEGINNER.—We believe you may obtain good plain backgrounds of any of the houses you name; and, if you have two, you cannot do better than have a dark grey and a light grey, the latter being especially necessary for vignettes, &c. We think that the cloth backgrounds have some advantages on the score of durability, as they are not so easily injured as those painted in distemper. Mr. Solomon keeps the cloth; whether any one else does or not, we do not know. We have seen at his warehouse a warm brown cloth very suitable for a dark background, and a light grey, answering admirably for the light background. 2. The rolling presses of the maker you name are, so far as we know, very good.

CARL HOLT.—We do not know of any especial house for arrow-root paper. We are doubtful whether it is manufactured by English makers. We see it in the list of Beyrich's papers, kept by Trübner, St. Dunstan's Hill; but we know nothing of its quality. We have had good albumenized paper from half a dozen makers, but it would be invidious to particularize. We regret our inability to answer private letters.

R. C. H.—In our opinion, No. 1 decidedly, we think the quality fully equal to the price. In choosing between 2 and 3, we should probably give preference to the latter.

E. L., Chester.—We fear there is no remedy against a person who pirates a photograph before it is registered. To be safe, you should not issue a single copy before registration.

A FORESTER.—There is no remedy but registration against piracy. The system of copying portraits at an absurdly low price is very annoying to respectable photographers; but without registration there is no remedy. As to the quality of these cheap reproductions being equal to that of the originals, it is, of course, sheer nonsense; they are generally very bad indeed, but, unfortunately, many of the public are not judges.

J. H.—The kind of camera and lens most suitable to an amateur must depend entirely upon the kind of work he is desirous of doing, whether landscape, portraiture, or reproduction, and also the size. Perhaps the lens of most general utility, being applicable to all kinds of work, and doing it all well, is the triple; a No. 1 triple is one of the most useful lenses we know. The kind of camera will much depend upon the kind of work, and whether it is desired for home use or travelling.

ROCHDALE.—A background with folding wings at each side, which can be opened or closed to regulate shadow, and a canopy over head, will permit very good pictures to be produced in the open air. With such a contrivance there is no reason why you might not take card pictures as well as large heads.

STONEY.—You have not sunned your bath long enough. In order to secure the full effect a long exposure is required in dull weather. See article on rectifying baths in our YEAR-BOOK. If the various remedies there given fail, precipitate your bath. 2. Waste developing solutions generally precipitate the silver they contain if they are allowed to stand. A pyrogallic solution which has become quite black is difficult to test with a sulphide. Add a little of an iodide which will enable you to detect by the yellow precipitate if any silver remain in solution.

N.—We are always interested in "N.'s" intelligent letters, and gratified by his suggestions. Regarding the subject of his last letter, he is unquestionably right in stating that all formulæ to be strictly accurate should be stated by weight, as the combining proportions of all elements are stated by weight. Where volumetric manipulations are conducted, a given measure is used, as "N." states, only where its relation is known to a given weight. In all exact chemical experiments, weight is the only safe guide for quantities; and it is quite possible that on the continent the system of weighing may obtain with all materials. In stating that where the term *parts* is given, in reference to fluids parts by measure should be understood, we simply stated the popular custom in this country, not only in photographic manipulations, but often carried out in the more important operations of pharmacy. Formulæ are, moreover, frequently defined expressly with relation to measured quantities, a fact implied in some of the tables in "Williams' Hand-book," to which he refers, where the words "by weight" are used, at once implying the possibility of understanding by measure, unless otherwise stated. In giving a formula for collodion, for instance, we might state it thus:—

Ether, sp. gr. ·725	...	...	...	40 parts, or 5 ounces
Alcohol ,, ·805	...	...	...	40 parts, or 5 ,,
,, ,, ·820	...	...	...	16 parts, or 2 ,,
Soluble cotton	...	...	...	1 part, or 60 grains
Iodide of cadmium	...	...	...	½ part, or 30 ,,
,, of ammonia	...	...	...	½ part, or 30 ,,
Bromide of ammonia	...	...	...	¼ part, or 15 ,,

The parts here are drachms, as may be seen from the last column; we should mean measured drachms of the fluids, and weighed grains of solids, and it would be so understood generally. The system of weighing everything, or at least correctly estimating its weight by a reference to its specific gravity and bulk, would be more exact, although more troublesome. As we have observed, however, we merely gave our view of the common custom, and upon that formulæ is generally based. We shall be very glad to see the whole system of our unphilosophical weights and measures reformed; but whether for ordinary formulæ it would be desirable to adopt the more troublesome method of weighing or estimating weight, because the method would be more exact, we are uncertain.

J.—LANCHESTER.—Many manufacturers arrange the sizes of their diaphragms so that each smaller one in succession shall require an exposure double that of the preceding one. The exposure is stated to increase as the stops decrease in size in the ratio of the square of the aperture: thus, an aperture of one inch would require four times as long as an aperture of two inches. In practice this rule does not seem to hold good, however, probably arising from the fact that the central pencils are more intense than the marginal pencils which are cut off.

GEO. STEWART.—So far as we can judge, the paper is not at all faulty. 2 If you wish for blacker tones, a lime bath will aid you. See chapter on the subject in our YEAR-BOOK just issued. In the same work you will find a chapter on the management of the nitrate bath, which will meet your difficulty as to the mode of replenishing.

J. A.—The general plan of your glass-house is very good, and the aspect will do very well. We should prefer some top-light, however; if 6 feet of the roof of the glass-room proper were opaque, and the remainder were of glass sloped down to the dark passage, we should prefer it.

J. J. BARDWELL.—Your subscription is paid to No. 337. No relation to the Suffolk family.

W. B. N.—Your suggestion shall receive careful consideration.

J. W. S.—We fear that neither of the lenses you name are quite suited for producing card pictures, the focus of either being too short to do justice to standing figures; but we should be inclined to choose No. 1, as probably best of the two. Will you please let us know the name of the London agent to whom you refer, as unable to supply the ALMANAC.

W. W. B.—It is very probable your plan will answer, but it is one which can only be satisfactorily determined by experiment. By this time you have probably got your ALMANAC, the chapter on Glass Rooms in which will supply you with various hints for proceeding.

JOHN JAMBLIN.—A few days elapsed before the posting of your letter, through an oversight, but it has now been posted some days. We are pleased with the portraits of Cuthbert Bede, the vignettes especially. The full figure is a little under-exposed. Your printing is good, and the rolling very excellent.

SODIUM.—Your sample of iodide of sodium does not seem to be far from the mark. It is not a salt which is very soluble in strong alcohol. We have met with samples more soluble in alcohol than the one you send, but cannot help you further as to obtaining greater solubility.

J. McC.—The question, whether a photographer can be compelled to give up a negative taken in the usual course of business has never been decided, we believe, in a court of law. As, however, questions of common law are decided by precedent and custom, we think the photographer would not be compelled to give up the negative, since it is not the custom to do so. It is quite certain that he could not be compelled to give it up without extra payment. The order is usually given, and payment made, for a portrait or portraits—incauing the prints—not for a negative from which to produce portraits.

Several Correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already received	110	5	10
Silas Eastham, Esq., Manchester	5	5	0
John Eastham, Esq.	5	5	0
Francis Bedford, Esq.	2	2	0
Chas. Heisch, Esq.	2	2	0
Valentine Blanchard, Esq.	1	1	0
F. W. Hart, Esq.	1	1	0
— Mainwaring, Esq.	1	1	0
W. E. Debenham, Esq.	1	1	0
A. H.	1	0	0
W R B....	0	19	4
H. W. D....	0	10	0
Chas. Corey, Esq.	0	10	0
Mr. Beecroft	0	10	0
Chas. Newman, Esq.	0	10	0
J. S.	0	2	6
H.	0	2	6
Mr. Gabell...	0	5	0
Anonymous	0	2	6
J. Solomon, Esq.	0	5	0
A Grateful Photographer	0	5	0
J. Pillans, Esq.	2	2	0
John G. Livesay, Esq.	1	1	0
W. England, Esq.	2	2	0
W. W. Rouch, Esq.	2	2	0
	£141	12	8

Photographs Registered during the Past Week.

MR. THOMAS ANNAN, 202, Hope Street, Glasgow,
Three Photographs of Rev. Dr. Craik.
One Photograph of Rev. David McEwan.
One Photograph of Rev. Robert Black, A.M.

MESSRS. KERR AND RICHARDSON, Glasgow,
Two Photographs of a Bust of H. A. Lambeth, Esq.

MESSRS. JOHN BURTON AND SONS, 54, New Street, Birmingham,
Photograph of Rev. Peter Sibree.
Two Photographs of Rev. R. Alliott, LL.D.

MR. JOHN JAMBLIN, 17, Park End Street, Oxford,
Three Photographs of Rev. E. Bradley ("Cuthbert Bede").

MR. LAMBERT WESTON, 17, Waterloo Crescent, Dover,
Photograph of John Pemberton Plumptree, Esq.

MR. WILLIAM MAYLAND, Huntingdon College, Cambridge,
Two Photographs of Mr. S. Jonas.

MR. PETER SKEOLAN, 12, Promenade Villas, Cheltenham,
Photograph—Copy of Water-Colour Drawing of the Manchester "Original Chelsea Bun Man."

MR. JOSEPH ROWELL MCLLEN, Lindsay Street, Dundee,
Lithographic Portrait of Rev. George Gilfillan.

MR. JAMES MCCORNICK, Park Street, Walsall, Staffordshire,
Photograph of John Barton, M.D., Deputy Provincial Grand Master of Staffordshire, in Masonic Costume.

MR. SKEOLAN wishes us to state that one only of the 5 photographs announced as registered for him in our last was a *copy*, the other 4 being from life. If photographers would fulfil the conditions upon which our publisher undertakes to effect registration, and *send a properly filled up form*, such mistakes could not occur.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 281.—*January* 22, 1864.

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PROGRESS IN PHOTOLITHOGRAPHY.

DURING last year several patents were obtained for photolithographic processes. Of some we have seen specimens, and heard something about the methods. In regard to others we await further evidence, but from what we have seen up to the present moment, we are disposed to think that very little advantage is gained in the new or patent processes over those the details of which have been fully stated. Amongst the most perfect examples of photolithography in line, which we have hitherto seen, are some recently produced in Berlin, by the process of Mr. J. W. Osborne, and the result of the joint labours of that gentleman and Herrn Korn, who possesses as a lithographer the highest reputation in Germany, where lithography has been brought to such a high state of perfection.

The examples to which we refer consist of a series of illustrations to a work which was to be issued at the beginning of the present year, describing the experiences of an expedition to Japan, China, and Siam, under the auspices of the Prussian Government. They are photolithographed by Herrn Korn, as we have said, by the process of Mr. Osborne, whose personal superintendence will, doubtless, have aided materially in the result. They are from the original very clever pen-and-ink drawings of Herrn A. Berg, the artist who accompanied the expedition, and who appears to have embodied character in a most admirable manner. It is a noteworthy circumstance that, although this gentleman is a skilled artist himself in the use of the crayon on lithographic stone, he has given the preference to the use of photography for rendering his work, as giving better scope for the expression of his ideas. Mr. Osborne, writing on the subject, remarks:—

I need not tell you that it is an interesting circumstance to find a living artist drawing on paper for photolithographic reproduction. That such drawings offer many serious difficulties, you will also realize, incomparably greater than those experienced in the reproduction of engravings, maps, &c. Although nominally black and white, you will perceive that much of the beauty of such things depends upon the exact rendering of the structure of the lines and upon the preservation of a not inconsiderable amount of half-tone, that is, the lines according to their position and importance in the drawing, pass from perfect black to a grey. This is a refinement in the reproduction of pen-and-ink drawings which the photolithographer must master before he can give successful expression to the "feelings" of the artist, for it is out of the question to get the latter class of persons to produce drawings which shall resemble etchings on copper. The materials with which they work do not admit of this, and the more clever and original the artists are, the more difficult it is to move them, so that, after all, whatever may be done with mechanical draughtsmen, the painters must, to a great extent, be left to themselves, and photolithographers must bend to them. The production of lines of varying intensity depends upon the power the operator possesses, of imparting to the different parts of the stone a varying attraction for the printing-ink.

I should not omit to add that, although Berg's drawings are called "pen-and-ink," much is done with the brush, in fact he puts no constraint upon himself beyond *endeavouring* to use the same ink throughout.

The especial feature which strikes us in these pictures, viewed as photolithographs, is the extreme delicacy and cleanness of the lines, the perfect absence of blurred or ragged edges in the finest touch, together with the force and depth of the general effect. In too many photolithographs there is a rottenness and want of continuity in deep tones, and a blurred, ragged edge, giving a thickened look to fine lines. The defects are, doubtless, often due to the negative not being sufficiently perfect, as well as to the imperfection of some of the processes. These illustrations are free from these defects, and possess a crispness and precision scarcely to be surpassed by copper or steel engraving.

There is some reason to hope that an English edition of the work will be issued, in which case many of our readers will have an opportunity of examining the photolithographic illustrations, and can determine for themselves the progress made in this direction.

THE ALLEGED EARLY PHOTOGRAPHS.

A CORRESPONDENT of the *Society of Arts Journal*, signing "H. G. H.," and in whom we recognize a gentleman having a practical knowledge of the various processes of etching and engraving, expresses a conviction that the Soho paper pictures are really aqua-tint engravings. After glancing at the history and peculiarities of these pictures, he says:—

All this appears to me to be quite intelligible to the eye and mind of any practised engraver and printer; and the prints themselves seem to interpret the mode of their production. In the first place I would say that the paper on which the impression is taken bears unmistakeable evidence of the use of a metal plate, a well-defined line having been impressed on the paper by the edges of the plate in its passage through the printing press. This is quite consistent with the production of copies of pictures on iron, copper, &c. With reference to the next point, the method by which the minutely granulated surface was obtained, I believe that any skilful acquatint engraver could reproduce a similar surface at any moment, if it were desired, by simply laying the ground of his plate by means of a delicate solution of any of the gums or resins used by acquatint engravers, the gradations from light to shadow in the pictures being dependent upon the action of acid in biting in upon the surface of the plate so prepared. That the effect obtained was due to an acid action is to me evident from the flatness of the parts of the picture which have been stopped out. This is especially apparent in the foliage in some of the impressions. Next as to the materials upon which the print was produced, paper, canvas, &c., the copies being frequently finished as oil paintings or water-colour drawings. The prints in the possession of Mr. Smith are upon a hard paper, the surface of which has been prepared, some of the impressions being in two or more colours. It was a common practice during the latter part of the last century to print from mezzotinto, acquatint, and chalk-engraved plates in several colours, and I think that any one who will carefully examine the Soho impressions will detect ample evi-

dence of a compound process of printing with coloured inks. These inks were applied to the plate according to a process given by Mr. Robert Laurie in 1776, and published in the second volume of the "Society of Arts' Transactions," where he says:—

As the ingenious and laborious works of many eminent men have been ushered into the world with inelegant and inexpressive cuts, principally owing to the great expense attending the execution of good engravings, I have been induced to attempt a method of engraving and printing in colours, which has answered my most sanguine expectations, both with respect to the ease and expedition with which they are executed, and, consequently, the little expense at which they may be afforded. In this manner, animals, plants, &c., for illustrating natural history, may be finished in their proper colours, very much like drawings, and greatly resembling nature. The plates will also admit of being repaired, so as to furnish a large impression. If this, my first attempt, should meet your approbation, it will encourage me, under your inspection, to proceed on a more extensive plan. The bird represented by the prints now laid before you is taken from one which Captain Cook brought from between the tropics, caught in his last voyage round the world, and I beg leave to submit the plate, from which the impressions were taken, to the consideration of the society. Mr. Laurie's explanation of the method of taking coloured prints from mezzotinto plates is as follows:—A copper plate, with an etched or engraved outline, dotted next the lights, and filled in with mezzotinto ground, is printed in colours, after nature, or from a picture, by the following process. The plate being warmed in the usual manner, the colours are applied, by means of stump camel-hair pencils, to the different parts, as the subject suggests; it is then wiped with a coarse gauze canvas, any other being improper; after this it is wiped clean with the hand as in common practice, and being again warmed, is passed through the press. The colours are mixed with burnt linseed oil, and those generally used by painters are proper.—ROBERT LAURIE, aged 20, Nov. 17, 1776.

This process of compound printing is now continued in a modified form, small dabbers being used for the broader surfaces in place of the stump pencils.

If the impression was to be finished as a water-colour drawing, it would be necessary to use a hard paper or to prepare the surface by coating it with isinglass, gum, albumen, sugar, or any of the ordinary common and well-known mediums. If a water-colour was to be copied, albumen or gelatine would probably be the material with which it would be prepared, a water-colour being used in printing from the plate; the two would then combine, but the colour would not be absorbed into the paper; if the coating of gelatine was thick, it would in a century be likely to perish, and there would be no difficulty in rubbing off the impression from the paper. If an oil picture was to be imitated, gelatine would not be used, as the two would not combine. If canvas was used to print upon, no doubt oil colours would be employed. In the case of water colours, it was necessary to harden the surface of the paper, in order to prevent the colours applied by hand from running or spreading. I have thus endeavoured to show how paper, copper, and canvas, and their employment, are quite consistent, and how at the same time the surface of the metal plate could be obtained from which to print in either oil or water colours. In conclusion I would venture to assert that, if it were desired on the ground of economy to reproduce any of the specimens exhibited by Mr. Smith, there would be no difficulty in finding the engraver and printer in the present day who would be ready to undertake the work.

Scientific Gossip.

IMPROVED PHOTOMETRIC PROCESSES.

OF all the numerous methods which have been lately proposed for the measurement of the chemical action of light, none are sufficiently simple to come into everyday use amongst photographers. Devised and worked out by skilled chemists with all the resources of a well-appointed laboratory at their command, the authors forget that the processes, to be of practical benefit, must be such as to be within the experimental means and manipulatory skill of a photographer, whose laboratory and dark room are most frequently compressed in one small apartment, inconveniently crowded even with the daily routine work. To such a person, processes which demand careful manipulative details, and accurate weighing, might as well not exist at all; although, if he could tell the photographic value of any desired time of the day, by a method not more abstruse or requiring more time than others, which he is constantly employing, he would frequently be tempted to indulge in the photometric luxury. Moreover, the question is of far more importance, when examined in relation to agriculture, public health, or the general physics of the earth, than it is when simply studied from the photographic laboratory. Had we actinometers or photometers as easily read, and as uniformly intercomparable, as are thermometers or barometers, meteorologists would occasionally reveal strange and important facts. The actinometric Fitzroy of the future could give us warnings of blight or pestilence sweeping across the country, hundreds of miles off, and rapidly bearing down upon different portions of our isle: the impending stoppage of the vitalising chemical rays would warn many besides photographers that there was danger in the air; and a careful tabulation and study of those waves of non-chemical action, which have not unfrequently been noticed even with our present crude and unmethodical testings, would reveal to us many facts, and possibly some few laws, bearing upon the origin and spread of epidemics. But these speculations are far in advance of our present knowledge. It will possibly be years before any actinometric process is devised of sufficient simplicity to come into general use, and whilst we confidently look forward to that time we must content ourselves for the present with chronicling those discoveries in photometry which may be regarded as steps in the right direction. One decided advance towards the desired goal has just been made known by M. Z. Roussin. He gives a solution which is highly sensitive to light; and consisting as it does of hitherto un-utilised salts, this by itself is a valuable contribution; but he also proposes a new way of measuring the change produced in his liquid by the light. This is not only applicable to his own process, but being remarkably simple and easy to be performed, will be of great value as applied to other sensitive liquids. We will briefly describe the way he prepares the sensitive liquid. It has long been known that a clear aqueous solution of nitro-prusside of sodium decomposes, upon exposure to the light, with deposition of prussian blue. A sheet of paper soaked in this solution, and dried in the dark, is capable of yielding a print when exposed to sunlight under a negative, and by simply washing the paper in water after removal from the printing frame, a positive of a beautiful blue colour will be the result. The quantity of prussian blue formed is in proportion to the intensity of the light and the amount of surface exposed. This reaction is, however, rather slow, and M. Roussin sought for means of increasing the sensitiveness of the liquid. When mixed with a per-salt of iron, nitro-prusside of sodium decomposes much more quickly in the light, whilst, at the same time, it preserves the desired property of equality in decomposition, and stability in the dark. In fact, the mixture of these two salts may be preserved indefinitely in darkness without decomposition, and may even be exposed to a boiling temperature without depositing any trace of prussian blue; showing that the heat rays are without influence in the decomposition, light, or the chemical rays alone producing the change. The best results are obtained by dissolving one part by weight of nitro-prusside of sodium, and one part of dry perchloride of iron in five parts of water. The preparation must, of course, be made in obscurity, and the filtered liquid preserved for use in a bottle closely coated with opaque paper. So sensitive is this mixture that a few minutes' exposure to solar light suffices to communicate to it an intense blue colour, and occasion an abundant precipitation of prussian blue. In order to estimate the amount of change which has taken place in the insolated liquid, several methods may be used according to the means at the operator's disposal and the delicacy which he desires to impart to the experiments. A quantity of liquid may be exposed to light in a flask, the capacity of which has been previously ascertained, and after the action has been allowed to proceed for a definite time, the solution may be filtered from the precipitated prussian blue. This, if collected on a filter, the weight of which is known, may be weighed after being washed and dried at 100° C.

Another plan, which is preferable in one respect, as it dispenses with the filtration and drying, although it is far less accurate, is the following:—Select some very homo-

geneous filtering paper, and cut it into pieces about six inches square. Weigh each piece separately, and note the weight in one corner with a fine pencil. Now soak the sheets in the foregoing solution, let them drain and dry, and then preserve them in darkness for future use. A considerable number of such papers may be prepared in advance, as they suffer no change, except when exposed to the light. They are of a uniform yellow colour. When required for use, expose one of these sheets, pinned by its four corners to a black board, to the full light of day for a definite time, and then wash it in several changes of water; dry it at 100° C, and finally weigh it. The increase of weight gives the amount of prussian blue formed, and, consequently, is a definite measure of the light. The objection to this process is, as we said before, the necessity of employing a very accurate balance.

The following plan is quite new, it gives very good and rapid results, and is further to be recommended, inasmuch as it is not confined to M. Roussin's solution, but may be used in most of the photometric processes already described, where the sensitive liquid deposits a precipitate under the action of light. Prepare a quantity of the above-named solution, and take its specific gravity as accurately as possible (either with a balance or a hydrometer) at the ordinary temperature of 15° C. This density, once taken, will not vary, and may, therefore, be recorded on the flask. Now get a flask which can be very accurately closed by a good cork, or glass stopper. Fill it with the sensitive liquid and expose it to the light in a uniform position. When exposed the required time, remove it to the dark-room and take the specific gravity a second time by the hydrometer. If the temperature varies from 15° C, the bottle must be brought to that by a short immersion in either warm or cold water as required. It will be evident that the deposition of a certain amount of prussian blue will proportionally diminish the specific gravity, which can be taken of any desired accuracy. The numbers obtained will represent inversely the intensity of the light; the higher the density the less actinism having been absorbed, whilst a strong chemical decomposition will be represented by a low specific gravity.

A FEW WORDS ON NITRATE OF SODA IN THE PRINTING BATH.

BY GEORGE PRICE.

In the present state of our knowledge of photographic chemistry, it is certainly incomprehensible—*if it be a fact*—that a weak solution of nitrate of silver, by the mere addition of nitrate of soda, is enabled to produce as good effects and yield as good prints, as a strong solution does without that addition. If the admixture of those salts caused them to enter into chemical combination, and crystals of a double nitrate of silver and soda could be produced by evaporation, we might fairly attribute the effect to some property of the double nitrate, not possessed by either of its constituent single ones. Although a solution containing two salts cannot truly be considered as a solution of the double salt formed by their chemical combination, as the double salt has not been crystallized out and re-dissolved, still, the difficulty—if not impossibility—of proving any chemical difference between the two solutions, would perhaps excuse our considering them as being identical. According, however, to the law which is said to regulate the formation of double salts, we cannot have a double salt of silver and sodium, as these metals belong to the same isomorphous group, whereas, the bases of all double salts must belong to different groups.

But, even the assumption of the formation of a double nitrate of silver and soda, would not explain the difficulty we labour under in endeavouring to comprehend the matter; because, the proportions recommended as being productive of the best results, viz., 20 grains of nitrate of silver and 40 grains of nitrate of soda, are not in accordance with the respective atomic weights of these nitrates; to be so, these proportions must be reversed; and, moreover, *we have an excess of the soda salt.* It is this excess of the soda salt, which would still render the matter incomprehensible; because, *by floating a sheet of albumenized paper upon a solution of nitrate of soda*—even if it be a saturated solution—*the albumenized surface will be effaced, and no visible trace of albumen will be left upon the paper.*

As this has invariably been the result whenever I have used a solution of nitrate of soda, and your talented correspondent, "A Photographer's Assistant," affirms the same, I have been very much surprised that Mr. Taylor's experience induces him to state *a contrary result.* In the *British Journal* for 15th September, 1863, page 364, he says:—"*I find that a solution of nitrate of soda by itself*, even when used in a concentrated form, *has no effect whatever in arresting the tendency of the film to be thoroughly washed off when subsequently exposed to the action of water.*" It is scarcely necessary to say, that the film on the paper cannot have a "tendency" to be washed off by subsequent treatment, *if it has been previously removed.* From the expression, "I find," we are perforce led to conclude that Mr. Taylor had himself tried the effect of a solution of nitrate of soda upon albumenized paper, and found that *it did not remove the albumen;* if so, I can only say, that I shall be extremely obliged, if he—or any one else—will be so kind as to send me a piece of paper with the albumenized surface retained after ordinary floating upon a saturated solution of nitrate of soda; provided the paper has not undergone any previous preparation to render the albumen insoluble; as its possession would enable me to solve another subject which I am at present unable to do.

In the first part of the sentence I have quoted, Mr. Taylor says:—"Does then the presence of the nitrates of ammonia or soda *increase* the power of the silver in the coagulation of the albumen? *Surely it must.** We have no reason assigned for the belief that the nitrate of soda "*must*" increase the coagulating power of the nitrate of silver, and assuredly it is what no one is warranted in *assuming.* The atomic weight of nitrate of silver, 170, is exactly double that of nitrate of soda, 85; therefore, 20 grains of the former require but 10 grains of the latter to be in equivalent proportion. Supposing, then, it were possible to form a double nitrate of silver and soda, and that we might consider the solution to contain such—although not crystallised out and re-dissolved, *the whole of the silver salt* would be required to produce it, but *only one-fourth of the soda salt;* thus leaving unappropriated in the solution an excess of nitrate of soda *equal to the combined equivalents of the suppositious double nitrate.* With the proportions before named we have a solution containing sixty grains of mixed salts to the ounce; two-thirds of these are *antagonistic* in effect to the remaining one-third, and moreover, it is *only this one-third that has any power to produce insolubility.* Is it not therefore something new in science, to assume that an opposing force has the power to "*increase*" the action of that to which it is opposed, especially when this opposing force of nitrate of soda bears the ratio of two, to one of nitrate of silver? Methinks we should be more warranted in assuming, theoretically, that the power of producing insolubility possessed by one-third would be counteracted or destroyed by the opposing power possessed by the other two-thirds. As we find, however, that practice proves such not to be the case, we call to remembrance a general law affecting solutions—viz., when different salts are in the same solution, and an insoluble compound is capable of being formed by any of their elements, that insoluble compound is sure to be produced. May it not therefore be in obedience to this law, that an insoluble albuminate is formed by the silver salt, notwithstanding the antagonistic power of the soda salt. Whether such be the case or not, I think we may candidly confess, *without shame,* that, if the virtue claimed for the

* In both quotations from Mr. Taylor's paper, the italics are my own.

addition of nitrate of soda be a fact, it is incomprehensible. I say, *if* it be a fact, because I have not yet been able to discover that the addition of soda is any improvement, and I have produced as good results, from the same negative, with a new 20-grain silver bath *without soda*, as with an 80-grain bath; but, according to my present experience, its use only necessitates longer printing, and then, even deep bronzing can be obtained.

18, *Mornington Road, New Cross Road.*

M. VIAL'S NEW PROCESS OF ENGRAVING.

THE committee appointed by the *Académie des Sciences*, consisting of MM. Dumas, Regnault, and Becquerel (reporter), has submitted its report on M. Vial's *Mémoire*, entitled "*Recherches sur les precipitations metalliques, ou Essai de reproduction des anciennes gravures, précédé et suivi de nouveaux procédés de gravure.*" The following is the report of the committee:—

"Although these processes are patented, your committee thinks that one of them rests upon an electro-chemical property which they believe to be unknown; they communicate it to the Academy without giving any opinion upon the artistic merit of this process, of which they are not competent judges. The process is as follows:—Transfer to a polished steel plate an engraving or drawing in fatty ink, or draw upon the plate itself with the same kind of ink; the plate is then immersed in a saturated solution of sulphate of copper, to which a small proportion of nitric acid is added. Five minutes afterwards the plate is withdrawn, washed, and the copper deposited upon it is removed by solution of ammonia, and the plate is engraved; the lines of the drawing are *en creux* (intaglio)."

In the ordinary processes of engraving upon metal, the fatty substance which forms the design protects the metal, in the parts covered by it, from the corrosive action of the chemical agents, and thus yields an engraving in relief. By M. Vial's process we have at once an engraving *en creux*. A similar effect takes place in drawing upon the plate with a crayon, black lead pencil, or pastel, or upon allowing spots of rust to form upon the steel.

We will endeavour to explain the effects produced. When a steel plate, upon which a design in fatty ink is made, is immersed in a saturated solution of sulphate of copper containing a small quantity of nitric acid, that portion of its surface which has not received any fat ink is immediately covered with metallic copper, the particles of which adhere together but very slightly, in consequence of the combined actions of the sulphate of copper and nitric acid upon the steel. At the same time, the copper solution gradually penetrates through the fatty matter by imbibition, and reaches the steel; then a voltaic couple of copper and steel is established; the copper already deposited is the negative pole, and the non-attacked steel is the positive pole. The decomposition of the sulphate of copper then becomes electro-chemical; the positive steel is attacked by the sulphuric and nitric acids, deep in proportion to the thickness of the ink. The copper arising from the decomposition is thrown down on its edges, and finally removes the ink, so as to form a design in relief with the copper, which is dissolved with ammonia. The results produced are remarkable in this respect, that the gradations of the *creux* (hollows) exactly represent the tints of the drawing, so that the engraving is a faithful representation of it. We are satisfactorily assured that M. Vial's process, tried by competent artists, seemed to them to be well worthy of attention in its relation to art.

It is interesting to observe that the lightest traces of ink, which are the first penetrated by the solution, are those beneath which the action has the least energy, and which cease as soon as the copper deposited upon its edges is extended so as to cover the points attacked. In a word, the action is slower in taking place, and its effects are deeper in proportion to the thickness of the ink. It is in these effects that the efficacy of M. Vial's process of engraving consists, the importance of which the Academy will be able to appreciate upon seeing the proofs of a certain number of engraved plates, many of which we have examined, that are now deposited upon the bureau.

Your committee, therefore, propose to thank M. Vial for his communication, and to give its approval to the application he has made to engraving on steel of a property, the effects of which had not been previously observed, and which is capable of rendering great service to the arts.

Upon this, M. l'Abbé Moigno remarks, in *Les Mondes*, "The numerous engravings placed before the Academy are, we know, for the most part, truly admirable; some, and among them a design furnished by M. Valenciennes, were executed in a few minutes, and leave absolutely nothing to be desired. In making an engraving *en creux*, M. Vial has really exceeded the limits of the possible. Let us hope that he may be enabled to bring engraving in relief, still more backward, to as good a result.

The *Mémoire* presented by M. Vial to the Academy included three processes. The first is based, 1st, upon metallic precipitations; 2nd, upon the affinity of acids for various metals. It consists in making a drawing upon paper which is transferred to the metal plate by moist application; or, what is better, the drawing is made direct upon the metal with a metallic ink, formed, for example, with a salt of copper in solution for steel and zinc, of a salt of mercury for copper, and of a salt of gold for a silver plate, etc., and to engrave it afterwards with an appropriate acid.

Thus a drawing made with a sulphate of copper ink, and transferred to steel, will immediately furnish an engraving without ulterior biting with acid being requisite. In this way, also, a drawing made upon zinc with an ink formed of sulphate of copper admits of a biting in relief with acid, the copper in this case playing the part of a protecting varnish in consequence of the greater affinity the nitric acid possesses for the zinc relatively to the copper. The second process has for its object the reproduction of old engravings without damage to the originals, and is applicable to engravings which have not been covered with a special coating for public wants. It is based, 1st, upon the antipathy of water for fatty bodies; 2nd, and like the preceding, upon metallic precipitations and the affinity of acids for metals. For instance, an engraving is impregnated at its back with a copper solution, and this aqueous liquid penetrates the paper only round the lines formed of fatty ink. Any other appropriate metallic salt, as salt of lead, of bismuth, of silver, &c., will produce the same effect. The proof is then placed face downwards upon a plate of zinc, for example, and submitted to a uniform pressure. The salt in the paper is immediately decomposed, reduced, and precipitated upon the plate, covering it entirely, except in those parts covered with the lines of the design, so as to give a negative image in relief representing with the greatest exactness the design which has served to produce it. Only a few seconds are required to produce this effect. Photography itself does not operate with greater rapidity or fidelity. We can now take negative proofs from the plate. To obtain a line engraving it is only necessary to immerse the plate in a bath of nitric acid which hollows out the zinc but respects the copper.

M. Vial has recourse also to another method which is based 1st, upon transfers, 2nd, like the preceding, upon metallic precipitations and the affinity of acids for metals, 3rd, lastly, upon the phenomena of electro-chemistry. We make a transfer or tracing of an old engraving on to the steel plate, by means of a soap of turpentine or petroleum applied to the proof, and immerse the steel plate in a bath of acid sulphate of copper, which precipitates copper upon the steel in a brilliant metallic state, respecting the lines of the design, so that the copper precipitated, serves as a varnish, while the steel, having more affinity than the copper for the acid, is bitten under the design by the phenomena of

electro-chemistry. The problem is thus summed up in two words, *cover* and *bite* at the same time.

Lastly, the third process, which is only an extension of the preceding method, constitutes, nevertheless, a new kind of engraving. It consists in making an autographic or lithographic transfer upon steel, not with turpentine soap, but with fatty ink; in making a heliographic design with bitumen of Judea, or a photograph with perchloride of iron; in drawing upon steel with indian ink, with black crayon, or black lead; in painting in oil or in pastel; in drawing with acid or with perchloride of iron; in a word, with any other substance susceptible of resisting the deposit of copper without preventing the action of the acid, or with any substance susceptible of removing the polish from the steel in the parts which are afterwards engraved when the steel plate is put into a bath of acidulated sulphate of copper.

M. Vial also proposes to take advantage of the reactions of metallic salts upon each other, and to turn to account these double decompositions by impregnating a sheet of white paper with nitrate of silver, and afterwards pressing it in contact with an engraving impregnated with pyrogallic acid or an alkaline sulphide, which would admit of the obtaining of an unlimited number of proofs without having recourse to a metal plate, the original engraving after being cleaned serving as many times as desired.

ON THE OXIDATION OF SILVER UNDER THE INFLUENCE OF CYANIDE AND IODIDE OF POTASSIUM.

BY DR. D. VAN MONCKHOVEN.

IT is well known to photographers that cyanide of potassium corrodes the negatives fixed in it, or, in other words, that it dissolves the picture. Iodide of potassium acts in the same manner, but with less energy.

Similarly, stains from metallic silver upon the fingers and linen are removed by cyanide or iodide of potassium.

Still, we do not fully understand how this is effected. For cyanide of potassium (K Cy) and the iodide (KI), in really dissolving the silver, must take the trinary formula K Cy Ag, or KI Ag. Moreover, some of the metallic silver put into contact with the cyanide or iodide of potassium, remains unchanged.

These facts have led us to attentively examine this phenomenon, and we have recognized that the cyanide and iodide of potassium (in aqueous solution), really dissolve the silver on condition of a current of air being made to pass through the liquid. The silver, in presence of cyanide of potassium, is oxidized under the influence of the oxygen of the atmosphere, and the oxide of silver thus formed is dissolved in the cyanide.

Silver.	Oxygen of the air.		Potassa.	Cyanide of silver.
Ag	+ O +	K Cy	= KO +	Ag Cy.

Therefore, when a negative is fixed with cyanide, it is preferable to immerse it in a vertical bath containing the cyanide solution, rather than to pour the latter on the surface of the negative, as is usually done.

We have said that iodide of potassium also possesses the property of oxidizing silver under the influence of the atmosphere. This property may be turned to account, 1st, to bring a positive on paper to a suitable tone, when it has remained too long in the pressure frame; 2nd, to write upon positives on paper, albumenized or not albumenized.

To attain the first object, the over-printed positive is first washed as usual (but in water which has not been employed to wash other proofs), then immersed in a solution of iodide of potassium, 5 parts to 100 parts water. The proof is immediately withdrawn and suspended to dry. Under the influence of the air it tends to disappear gradually, and the corroding action of the iodide is arrested by immersing the proof in water. If the positive has been much over-printed, the action of the iodide must be renewed several times.

Toning and fixing are then performed in the usual manner. To write upon a paper positive, on the corners, for instance, dissolve 2 drachms of iodide of potassium in 4 drachms of water. Dip a steel pen into this solution, and write with it upon the proof after it is completely finished and glazed. In the course of a few moments the characters will appear, for the iodide has locally dissolved the picture. The characters are ineffaceable, because the iodide of silver formed under these circumstances is insensible to light.

These facts, true for cyanide and iodide of potassium, are not found in hyposulphite of soda.—*Bulletin Belge de la Photographie.*

FORMIC ACID IN THE DEVELOPER.

BY H. COOPER JUNR.*

AT the final meeting of the last session of this society, an experimental committee, of which I was a member, was appointed to inquire during the ensuing summer, into the action of formic acid in the developer.

Unfortunately, through a prolonged attack of ulcerated throat, I have been prevented from carrying out my experiments as far as I could wish.

I have not yet heard the results of the experiments of the other members of the committee, but hope to do so this evening.

During the recess many angry letters have appeared on the subject in the photographic journals, but as I am sure *that* is not the way to ascertain the truth, or encourage others to state the results of their experience, I trust you will not be too hard upon me if my conclusions do not quite agree with yours.

In my first experiments, I complied exactly with M. Claudet's formula, using

Bath.

35 grains pure fused nitrate of silver, $\frac{1}{5}$ of a drop, strong nitric acid, 1 ounce distilled water.

Collodion.

2 ounces of Thomas' ripe cadmium, and 2 ounces of potassium iodized collodion of the same maker, which was iodized a week before mixing with the cadmium.

Developer.

Pyrogallic acid... ...	... 3 grains.
Morson's formic acid ...	... 1 drachm.
Water (distilled) ...	... 1 ounce.
Alcohol...	... *quantum suff.*

Under the most favourable conditions I have not been able to procure satisfactory negatives by this special formula with *less* exposure than with bromo iodized collodion and iron.

One peculiarity which I have noted is that the image appears to be entirely *in* the collodion, so that when the plate is dry one would almost fancy it had been varnished. No matter how intense the negative may be, there is no piling up of the deposit above the surface of the collodion. The chief faults are too great intensity, and a granular appearance of deposit, which is not nearly so minute or fine as when iron and a bromo-iodized collodion are used either with or without formic acid in the developer.

With regard to my other experiments I may briefly sum up in the following remark—that I do not at present see any reason to materially alter the opinions expressed by myself at the meeting at which the committee was appointed. They were to this effect—First, "That under *certain* conditions formic acid is an accelerator in any developer;" and secondly, "That in a good light the usual developer of iron requires less exposure to produce a satisfactory result than pyro and formic acid; and that formic acid and iron, with a *little* acetic acid, is quicker than all." See PHOTOGRAPHIC NEWS, June 12th, 1863.

* Read at a meeting of the South London Photographic Society, Jan. 14, 1864.

SOME REMARKS ON THE MALT PROCESS.

BY THE REV. D. T. K. DRUMMOND.*

THE time is past, I imagine, when absolute superiority can be claimed for one dry process over another. There is not one of the many which have been proposed from time to time that has not, in the hands of a skilful manipulator, produced results which leave little to be desired.

Any man may select any of the numerous preservatives proposed for dry plates, and by dint of care in the selection and use of his materials, scrupulous cleanliness in his work, and a few grains of patience, he will assuredly obtain pleasing, if not first-rate, pictures. I believe one of the great secrets of success is to choose your process once for all, and to keep to it doggedly, without being enticed to dabble in half a dozen, which generally ends in perplexity, disappointment, and great grief.

I do not profess to have anything novel to bring before the society on the subject of the Malt Process, and I feel as if I might be charged with presumption in making any remarks upon it at all. Still, I think every photographer, however limited his experience may be, is bound to make any suggestions, which may possibly be useful to some, encouraging to others, and not uninteresting to all who are, like himself, under the spell of our noble art.

I venture, then, to offer a few remarks on the Malt Process, which I cannot but think has not received so much attention as it deserves; and I shall indeed rejoice if I can induce others, who have more time and ability than I have myself, to devote themselves to malt, in a manner against which even a total-abstinence man can take no exception.

It is no inconsiderable benefit in the malt process that the material itself is so cheap, and can be always so easily obtained. Then the manipulation is very simple and easy, and is not accompanied by so many perils as some of the other processes

But it is to the film of the malt plate that I would specially advert. Nothing can exceed the beauty of a well-prepared plate, either when just covered with the malt and set up to dry, or when it is dried and ready for use. In the latter condition the surface is so very fine that it is hardly possible to distinguish it from polished glass. When developed also and fixed, the plate dries very rapidly, and the surface of the picture is exquisitely soft and beautiful.

Moreover, I cannot but think that the malt film has a delicacy of definition peculiar to itself. I feel confident that a little examination will show that it is superior to wet collodion in this respect; and if I were in the habit of taking positives I should never use anything else. An American artist, I understand, is constantly in the habit of thus using it. Of course the same property makes it most valuable for transparencies, magic-lantern slides, &c.

But that which specially distinguishes the malt plate, as I think, from others, is the remarkably non-actinic character of the film. A negative which in other processes would be set aside as most unlikely to give anything but a chill print, will in the malt give brilliant pictures.

The advantages of this property are obvious. It makes the development more simple, and a failure less probable; while, even in dull weather, prints may be taken from the negative in a wonderfully short time From about twenty minutes to half an hour is about the longest exposure I have ever given, even in very dull weather, to a print under a malt negative.

I have brought down with me this evening one or two prints and their negatives (12 × 10), which will, I think, illustrate what I have just stated. I shall show the prints first, in order that their depths and brilliancy may be noted, and then the negatives from which they have been taken. One of the specimens I exhibit this evening is a print of the Great Gateway of Elgin.

A copy of this was in the Exhibition of 1861; and I have brought it down this evening because the picture is considered a fine one, and the negative from which it was taken is a striking proof of the statement I have made. Further, I may add concerning it that the plate had been prepared some ten days before using. It was then exposed in the camera, and then not developed for ten days subsequently. The other picture is a subject which every photographer knows to be a difficult one in landscape-work, where the trees on either side of a river are so close together as greatly to obscure the light. I may mention that the prints I have with me are untouched, and have not been rolled.

My method of preparing malt plates is the following: I do not mean to say that it is the best, nor am I prepared to give scientific reasons for the different steps in it; but having found that I generally get good plates by adhering to this plan I keep steadily to it.

1. I coat the plate with india-rubber, and use the ordinary negative collodion.

2. I prepare the malt thus:—Into a little pan lined with porcelain I pour 40 oz. of water. I heat the water up to 175 degrees, and immediately add 6 oz. of good malt, stirring carefully. I then set it aside to cool for a short time, then strain it through muslin, and then filter it; after which it is ready for use. I do this immediately after breakfast, and use the malt the same evening. I never keep it longer.

3. In preparing the plate, I wash it thoroughly and carefully after taking it from the bath, either in three dishes or in one, with three successive changes of water. The plate is then set up on blotting-paper to drain for about a minute, and then the malt is poured over it twice: and having cleaned the back, the plate is finally set up to dry,

There are two modes of treating the plates when prepared—a long exposure with a lengthened development, or a short exposure and a quick development.

In such a variable climate as ours it is important to have the latter at command. Nevertheless, on the whole, I prefer the former, when the weather and the light are at all steady, as giving less trouble, and perhaps (though in this I speak doubtfully, from not having tried it so much) being more under control.

With a lengthened exposure, the ordinary one-grain pyro solution, with nitrate of 30 grains, is what I have always used. For perhaps half a minute not the least appearance of a picture is seen; but then the whole comes out with great evenness and regularity; and as the film is based on india-rubber, it will bear any amount of development.

With a short exposure the mode of development is different. Place the plate on the levelling stand, and pouring on water let it stand for more than a minute; then thoroughly wash under the tap, or by pouring water from a jug strongly over it. Then pour on some distilled water, and drain. Then dip for one minute in a bath solution of 20 grains, and develop with iron as a wet negative. I took a picture last month, with Dallmeyer's triplet No. 4 and ¾-inch stop, in one minute and a half.

So far as to the malt plates; but I cannot conclude this paper without a word as to Dallmeyer's triplets. It is impossible to speak too highly of them. Their definition is wonderful; and even when the smallest stops are used the light is singularly uniform over every part of the field. I wish to draw attention to several prints I exhibit this evening. Their size is 12 × 10, and yet they are done by the Triplet No. 2, which nominally works up only to 8½ × 6½. The edges of the prints are doubtless not perfectly sharp. The diaphragm I used was only No. 3; No. 4 would have sharpened everything; or, if not, certainly No. 5; but I like the pictures as they are, and need hardly say that by using this glass instead of a larger one, according to the sort of scenery you wish to get into your picture, you can command most extensive views.

I have to apologize for these brief remarks, which I now lay on the table of the society. It is impossible to say how much, under God, I owe both in mind and body to photography in my hours of leisure, and I would gladly, by any means in my power, put a spoke in the wheel of its advancement.

* Read before the Photographic Society of Scotland, Nov. 10th.

PRINTING.

BY H. COOPER, JUN.*

MUCH has been said and written lately about weak printing baths; and as I, like most others, have tried numerous formulas, said to be infallible, with more or less success, though I must say rather the latter than the former; I should like to occupy your attention for a few minutes this evening, by stating the results of my experience, as it rather differs from any that I have yet seen remarked upon, and I trust we may all derive benefit in the discussion which will, I hope,

* Read at a meeting of the South London Photographic Society, Thursday, January 14th.

follow these remarks, by *again* comparing notes, and thus testing the value or fallacy of certain formulas. I particularly refer to the use of nitrate of soda as an adjunct in obtaining great brilliancy from weak silver solutions. But, at starting, I must promise that I have no astonishing successes to bring before you, and that I shall only state the bare facts, leaving the why and the wherefore to be solved by gentlemen more competent than myself for the task.

About two years ago I used a bath of 20 grains nitrate silver, and 20 per cent. of alcohol, with tolerable success. The chief difficulty occurred in drying; for, unless the position of the paper were changed, the surface solution, from containing so much spirit, ran in streaks which showed slightly on the finished picture; to obviate this evil, which becomes exceedingly irksome upon preparing a large quantity of paper (even such a quantity as an amateur calls large), I reduced the proportion of alcohol to 5 per cent., and raised that of the silver to 35 grains to the ounce; and I then found that with ordinary albumenized paper I obtained prints as good as when an 80-grain bath was used.

Many of the prints before you were produced with a bath of from 35 to 40 grains.

I generally use 1 drop of strong nitric acid to the ounce of bath solution, and slightly fume the paper with ammonia, as I fancy that the albumenous surface is better preserved in its integrity than when a neutral bath is used.

I float the paper three minutes on the solution just described.

There is one point which I fear is sometimes overlooked, that is, to use in comparative experiments the same sample of paper with each bath; of course it is a great advantage to prepare, say three or four different samples on each solution, as I need not remind you that what answers well with one kind of paper is often not suitable for another.

Seeing the flaming accounts of the great success attending the employment of nitrate of soda with weak solutions of silver, I made a large quantity of bath solution, containing, to the ounce of water, 20 grains nitrate of silver and 40 grains nitrate of soda.

Upon commencing to use it, great was my horror, as you may imagine, to find the albumen entirely dissolved from the paper.

"A Photographer's Assistant" has called attention to the fact that a solution of nitrate of soda very rapidly dissolves dried albumen; but contends that the nitrate of silver coagulates it as fast as softened, so that the only practical result is that a much shorter floating is required. In my own practice I do not find the 20 grains of nitrate of silver sufficient to overcome the solvent power of the nitrate of soda. The Editor of the Photographic News suggests, in an answer to a correspondent, that this failure might be caused by the solution being alkaline; but in my case I am confident that such was not the cause, as my bath was decidedly acid! I now divided the bath solution into two quantities; to one I gradually added alcohol, to the other nitrate of silver, trying a sheet of paper after each addition. A gradual improvement was observed in both instances; but most marked in the latter.

I continued these trials till one bath contained 40 grains nitrate of silver to the ounce, and the other 2 drachms of alcohol. Some of the prints obtained from both were very fair, but yet not at all up to the mark. I say *some of the prints*, as I could hardly get two pieces of the same sheet of paper to turn out alike. Mixing the two baths, I added silver till the strength was—

Nitrate of silver	40 grains
Nitrate of soda	40 „
Alcohol	1 drachm
Water	7 „

Everything now seemed to promise to go well, but the prints obtained were decidedly not so good as those for which a 35-grain bath, with no additions whatever, was used. From the prints I now show, you will see that the tendency of nitrate of soda in my hands is to produce terribly mottled prints. To prove that this was not produced in the prints before you by toning, I have here a piece of the same paper exposed to light and simply washed. You will also perceive, on carefully examining the prints, that, even in the best, a portion of the albumen has been removed from the surface of the paper. You will not, therefore, be surprised that I intend to banish nitrate of soda from my printing operations, unless it very speedily puts on a new face. The sample used in my experiments was of a very pale brown tint, and slightly contaminated with a chloride. It was perfectly neutral to test paper, and therefore contained no carbonate.

I feel naturally rather diffident in venturing an opinion upon a subject which has been so thoroughly discussed by nearly all the first amongst both professionals and amateurs, but I think that if the albumenous surface can be coagulated by any means, either before or whilst sensitizing, the latter would, of course, be preferable; that 20 grains of nitrate of silver is the maximum required to produce most brilliant results. Alcohol prevents the solution of the albumen to a great extent, but has, as already remarked, some disadvantages attending its use. A large dose of nitric acid in the bath—which may afterwards be neutralized with ammonia—is also a powerful adjunct to this end. I propose that in discussion, we turn our attention particularly to this part of our subject.

Having some negatives that were too thin and flat to produce brilliant prints in the ordinary way, I procured some "enamelled paper" from Messrs. Harvey, Reynolds, and Fowler, of Leeds, and having been very successful in printing upon it, I will give a short *résumé* of my mode of operation. In some respects, I am much pleased with this paper, the definition being truly marvellous, but of course, to me, the highly varnished appearance is most objectionable.

En passant, I may remark, that though some persons are fond of strongly glazed pictures, yet I find the general opinion to be in favour of prints the surface of which is less glossy. Many who have seen the prints now before you have exclaimed "Yes! very nice and very pretty; but don't you think they would be better if they were not varnished?"

I hope shortly to obtain from Berlin, through the kindness of Mr. Fowler, some of the paper unalbumenized. I intend trying Iceland moss and arrowroot, instead of albumen, on it. De la Rue and Co. have been at some trouble in preparing paper with different so-called enamels, but I have not as yet been successful in printing on any of the samples supplied by them.

But to my task. I use a 50-grain bath, moderately acid, about 1 drop of strong nitric acid in 3 ounces of bath, and 5 per cent. of alcohol. I have tried floating from 1 minute to 4, without perceiving much difference in the result; but, everything considered, I would recommend 1½ minute as the best time. Suspend the paper by two corners, in rather a damp atmosphere, for if it becomes too dry, it will be found to be cracked all over. If not required immediately, it should be kept *flat* in a portfolio, or under a weight. This precaution should also be observed after exposure, and the finished prints should be dried between folds of blotting paper to prevent their curling. A little care is also necessary in mounting and rolling; but I can assure you that the need of taking these precautions is not so irksome as you might imagine.

If printed upon *unfumed*, the enamel paper is rather insensitive, and gives dusky red prints, but when fumed, the improvement is almost incredible, it is nearly three times more sensitive, and it does not lose more in toning and fixing than when unfumed. This valuable property I have not found to be possessed by any other paper. Generally, what is gained in *printing* by the use of ammonia, is lost in the after processes. Those who try this paper for the first time will doubtless be rather astonished at its behaviour in the printing frame, as it prints very blotchy, &c.; this will, in most instances, all disappear in the fixing solution, leaving a remarkably pure and even surface. When this is not the case the

paper will be found to have been defective in the first preparation of enamel. In toning remove the prints whilst they are in the purple-red stage, as, upon drying, they will become much colder. By a little attention to this fact, the most magnificent tones may be produced. I always use tepid water for washing, and, finally, boiling water; this, in both theory and practice, I believe to be correct.

[We have received from Mr. Cooper, since the reading of his paper, some specimens by Dr. Maidstone Smith, which he had intended to bring before the meeting, as illustrating an experience contrary to his own, but had not, at the time, permission to do so. The prints are amongst the most brilliant and vigorous we have ever seen. We subjoin an extract from the letter referring to them:—

I have very little to tell you about "the cards" I sent you lately, but I may, perhaps, here say that, in sending them, it was not as specimens of what I consider these portraits should be, but of the amount of vigor attainable from 20-grains nitrate of silver, with 40-grains of nitrate of soda, sensitizing bath.

The negatives were developed with iron, acetic, and formic acids, a formula given, we hear, years ago, by Mr. Thomas Rodger, of St. Andrew's, Fifeshire, a very great authority in Scotland, and subsequently strengthened by bichloride of mercury and iodide of potass, in combined solution, a method, by-the-bye, whereby you can get any amount of density you please, or as little, without stained hands or dress, which is more than can be said of all the other intensifiers.

The collodion was various, as also the formula of toning lime, acetate and phosphate of soda, but all sensitized on the weak bath.]

FRAUDULENT TRADE MARKS.

On the 1st of January an important Act of Parliament, the main provisions of which it concerns all persons engaged in trade of every description to know, came into practical operation for the first time. It may be the more necessary to explain the scope and objects of this statute, since it was passed in August, 1862, more than a year ago. The Act, besides, is of a most stringent character with respect to penalties, and by a network of provisions carefully devised aims at the punishment and suppression of every conceivable fraud in the marking of merchandise and the sale of merchandise falsely marked. Its short title is "The Merchandise Marks Act, 1862," and it makes it a misdemeanour to forge or counterfeit any trade mark, or falsely to apply any such trade mark, with intent to defraud, whatever the article to which it may be applied, whether it be a cask, bottle, stopper, vessel, case cover, wrapper, band, reel ticket, label, or any other thing in or with which any commodity is sold, or intended to be sold. Again, it is from henceforth an offence for any one to sell or expose, either for sale or for any purpose of trade or manufacture, articles with false or forged trade marks attached, the penalty being the forfeiture of a sum of money equal to the value of such articles, and a sum, besides, not exceeding £5 nor less than 10s. It is made obligatory on every person who shall sell an article having a false trade mark to give information, on a demand in writing being made upon him, as to where he procured it; and power is given to justices of the peace to summon parties refusing or neglecting to afford such information, and, in the event of their persisting in their neglect or refusal, to impose a penalty of £5. Further, to mark any false indication of quantity upon an article with intent to defraud is made punishable by a penalty equal to the value of the article and payment of an additional sum not exceeding £5 and not less than 10s. This provision will apply among other cases to the familiar instances of pale ale sold in bottles and of cotton reels and the like on which the contents are falsely denoted. There is a clause according to which the vendor of an article with a trade mark is to be deemed to warrant or contract with the purchaser that the mark is genuine, unless the contrary shall be expressed in some writing signed by or on behalf of the vendor, and delivered to and accepted by the purchaser. The seller of an article, too, with a description upon it of its quantity, is to be deemed to contract and warrant that the description is true, unless, as before, the contrary shall be expressed in writing delivered to and accepted by the buyer.

[It is probable that the operations of the above-named Act may be made available for the protection of photographers in various ways. It has been suggested that by appending a trade mark to all original photographs, piracy might be prevented, but we scarcely see that such a course would afford any protection, as, to make the mark of any value for that purpose, it must be placed prominently on the picture itself—a very undesirable proceeding. But in regard to false quantities or qualities of various chemicals, such as chloride of gold, &c., it is clear that a remedy may be obtained under the Act.—ED.]

A SHORT LESSON IN PHOTOGRAPHY.—No. 17.*

THE next process which claims our attention, and one to which our attention was particularly called both by F. F. Thompson, Esq., and H. T. Anthony, two well known photographic explorers) is denominated the Milk process. This, like many others of a similar nature, is a dry process, and is said to work well.

With amateur photographers the wet collodion process, in a great measure, is becoming gradually relinquished, and the various dry processes are taking its place; hence the great search after preservatives by which the sensitized collodion film can be maintained for a long time in a normal condition or sensitiveness even when the film of collodion is dry. Amongst the preservatives in vogue are found: tannin, gums, resins, milk, honey, syrups, malt, serum, &c. The best seems to be, without doubt, tannin; and the attention of photographers is directed mainly to the perfection of the tannin process.

The disadvantage in the dry process is the diminution of sensitiveness in the film, which thus requires a much longer exposure. As soon as this can be easily and totally overcome, there can be no hesitation whatever as to the superiority of the dry plates to the wet plates: for, the mechanical arrangements for packing, exposing, and changing the dry plates have arrived at a high degree of perfection in the hands of the Messrs. Stock and Brothers. The changing-box of these gentlemen is one of the most practical photographic appliances that can be imagined. A dozen plates, more or less, are placed in parallel grooves compactly together in a box impervious to light. Upon the end of this box the plate-holder is made to slide in grooves in such a way, by means of a dentated rack and springs, that an elongated slit in the end of the plateholder coincides exactly with a similar slit over a given plate.

The covers of these slits are opened and closed cosentaneously, and the number of the plate is indicated by the dentation on the rack. By inverting the packing box a dry plate slides down into the holder; the latter is then separated by sliding it out of the groove from the packing box; in the act of sliding the slits are closed so that no light can penetrate into either chamber. The operation of transferring a plate from the packing box to the holder is the work of a moment. The plate can then be exposed, and by a reverse action it is again deposited into its original cavity in the plate box. The trouble, therefore, of taking pictures by this process is reduced to a minimum quantity of out-door labour.

An experienced photographer, however, can alone succeed; because, not knowing at the time the result obtained, it requires the utmost care and experience in focussing and in the time of exposure, as well as in the selection of the proper

* From *Humphrey's Journal.*

time in reference to wind, weather, and light, in order that he may have gained a firm reliance in his manipulations so as to ensure success. With this experience and care in the preparation of the plates, their preservation, and proper exposure, there is no doubt at all that, with a given number of trials, dry plate photography—where wet and dry plates are applicable—will be more successful than wet plate photography. On the contrary, the advantages of the wet process are the production of almost instantaneous pictures, the development on the spot, and the repetition of the operation in case of failure.

Those once accustomed to the *hardships* of the wet process, in dragging behind them a locomotive laboratory, seem to be unconscious of their toil and to deride innovation.

It is certain, at present, that where the two processes are equally practicable and applicable, the wet process is the one to be preferred in living scenery; and where the transportation of photographic paraphernalia is not a burden, it will continue to be preferred in cases where the dry process, with less trouble, would accomplish an equally good result. The polite quarrels of Siccus and Humidus do not change the conditions of things; and either process has its advantages and disadvantages according to the circumstances in which it is placed, and by which sometimes one and sometimes the other is to be preferred.

The practical photographer must not, in fact cannot, be the firm partizan of either party in exclusion of the other, because he would not then be really practical; for to be practical is to use the best means under given circumstances.

It would be an absurdity, because almost an impossibility, to employ wet plates in the preparation of transparent positives on glass by contact—with dry plates the operation is in every sense of the word easy, quick, and practical. It would be equally absurd, because as yet impossible of success, to attempt by means of dry plates to photograph the vitality of Broadway, the mobility of old Ocean, the moving, undulatory masses of water at Niagara, or the onslaught of a brigade on the field of battle.

Do not regard, then, the Wet and the Dry process as antagonistic to each other, but cultivate either to the greatest extent as means by which certain ends can alone be attained.

The Milk Process.

The plates of glass are properly prepared on the edges, thoroughly cleaned and polished, and then coated with either gelatine or albumen, taking care above all things to avoid all deposition of dust—this previous coating with gelatine or albumen in the tannin process, as also in this and many other processes, is far from being absolute; its object seems solely intended to prevent the collodion film from scaling off from the glass in the subsequent operations of developing, intensifying, and fixing. The same result can be obtained by varnishing the edges of the plates after sensitization and drying. This, however, is troublesome: it is also injurious to the plates, because during the operation they are exposed to a light which, after all, is more or less actinic and thus conducive of fogginess.

When the plates thus treated with gelatine or albumen are thoroughly dry, they are next coated with collodion: each plate is gently warmed over a spirit lamp until the film of moisture at first produced totally disappears. It is then immediately flowed with collodion in the usual way and immersed in the bath of nitrate of silver, until the film has assumed the proper cream-like appearance indicative of the production of iodide of silver in the collodion film.

The plate is then taken out, and reared in a pail of rain water, inclined at an angle of about fifteen or twenty degrees, and with the collodion film downwards, in order that the excess of nitrate of silver, by reason of its superior specific gravity, may sink unobstructedly to the bottom. In the meanwhile another plate is collodionized as before, and placed in the silver bath.

Previous to the commencement of collodionizing, etc., the plates, the preservative mixture is prepared as follows:

Powdered dried milk of commerce	...	...	...	30 grains
Distilled water	...	...	...	1 ounce
Loaf sugar	...	...	...	10 grains
Alcohol	...	...	...	6 drops

Or take ordinary skimmed milk and add sulphuric acid whilst it is simmering as long as any coagulum is formed (be careful not to add too much, and where it is suspected that this is the case, throw in a little lime until there is no longer any acid reaction on test paper). Filter the whey from the coagulum and lime salt, and evaporate the filtrate to dryness. Then prepare the preservative as follows:

Dry whey	...	...	...	30 grains
Distilled water	...	...	...	1 ounce
Loaf sugar	...	...	...	6 grains
Alcohol	...	...	...	6 drops

Remove the collodion plate from the first pail, flow over it a few drachms of distilled or rain water, and repeat the operation several times with fresh water, and then place it in a dish of distilled water, whilst the next plate is taken out of the silver bath, and a third plate is flowed with collodion and immersed in the silver solution. Now go back to the plate in the dish of distilled water, take it out and let it drain for a few moments. The next operation consists in flowing the plate with the solution of milk or serum. This is performed as in collodionizing; but it is repeated several times; finally the plate is allowed to drain and then reared away in the drying chamber excluded from light.

The Malt Process.

This is in every respect similar to the preceding, excepting that a solution of *fresh wort* is employed as the preservative. Wort can be obtained any day from the brewers of malt beer; or it can be prepared by making an infusion of malt in hot water in the same manner as tea is made; the resulting infusion is a saccharo-amylacious solution which acts very much in the same way as a solution of serum in preserving the collodion film sensitive.

The milk plate, as well as the malt plate, is developed with the ordinary solution of pyrogallic acid, citric acid, nitrate of silver, and alcohol. Taking from stock bottle No. 1, as given in the preceding number of this Journal, two drops, and from stock bottle No. 2, take two drops to each drachm of water; and as soon as the image appears add more of No. 2, until the picture is sufficiently intense.

Whenever No. 2 is added to No. 1, take care to shake well after each addition and before application to the plate.

New Toning Process.

By the kindness of Mr. H. T. Anthony I am permitted to communicate the following new toning process. The specimens of card pictures toned by this process were superb, the tone was a bright, rich, deep purple-black; it can scarcely be excelled.

Prepare in the first place a solution of the peracetate* of iron, by digesting iron filings or iron tacks in acetic acid *to saturation;* a deep red solution is obtained which cannot be crystallized. Mix ten drops of this solution with an ounce of water, and then add 4 drops of the mixture to the toning bath, consisting of nitrate of uranium and chloride of gold to the amount of 15 grains of the latter and a corresponding quantity of the former, as well as of water. A black precipitate ensues which is soon redissolved. Mr. Anthony states that the only trouble with this toning process is its want of stability, or if I understood rightly, the bath is capricious, sometimes yielding good results and sometimes failing to do so.

* Mr. Anthony recommends the use of the *protoacetate* of iron; I have ventured to change it into the *peracetate*, because I believe this salt to be the one he meant from the mode of preparation designated at the time of my visit.

Proceedings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held in the City of London College, on the evening of Thursday, Jan. 14th, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes of a previous meeting were read and confirmed, after which the Chairman read a letter from Mr. Ross, calling attention to some specimens he had forwarded. These consisted of some panoramic photographs, 15 in. by 7 in., by Mr. C. A. Munro, of Lisbon. The negatives were produced on curved plates, with bromo-iodized collodion, developed with iron, and intensified with pyregallic acid and citric acid; exposure averaging from 7 to 10 seconds. Also a fine large photograph of a bas-relief, taken by Mr. Clifford, in Spain, and some imperial photographs, and views of the Crystal Palace, which had been exhibited and described at the previous meeting of the Society.

Mr. HENRY COOPER then read a paper on "Weak Printing Baths" (see p. 25).

Some very fine prints were handed round, in illustration of the paper.

A conversational discussion ensued, in which several members expressed surprise at the dissolving of the film, which Mr. Cooper described.

Mr. PRICE had tried nitrate of soda in the proportion of 20 grains to 20 of nitrate of silver in an ounce of water. He did not perceive any advantage in its use, but there was no dissolving of the albumen. He thought there must be some peculiarity in Mr. Cooper's albumenized paper.

Mr. COOPER had used various samples of commercial paper.

Mr. HENDERSON had used as much as 55 grains of nitrate of soda, and 5 grains of nitrate of silver in an ounce of water, and did not find the albumen dissolve. In answer to a question, Mr. Henderson added that he floated the paper for 3 minutes.

Mr. COOPER found that merely drawing the paper over the surface of the solution caused the albumen to dissolve. The bath was neutral.

Mr. SEBASTIAN DAVIS had tried a bath containing 30 grains of nitrate of silver and 60 grains of nitrate of soda to an ounce of water. The albumen did not dissolve, but he did not see any great advantage in the use of the nitrate of soda, as he soon found it necessary to add nitrate of silver to the bath. He had found the best results from a bath containing 60 grains of nitrate of silver and 40 grains of nitrate of soda to the ounce, adding also ¼th of methylated spirit to ⅞ths of water. Nitrate of soda not being soluble in alcohol, the whole 40 grains were not taken up, so practically he used a saturated solution of nitrate of soda in the mixture of spirit and water, with 60 grains of nitrate of silver.

Mr. COOPER had tried a similar plan, and although it prevented the solution of the albumen, he found no advantage to the print.

Mr. BLANCHARD asked Mr. Davis if he found any marked improvement from the use of nitrate of soda.

Mr. DAVIS found the bath less apt to discolour, which was singular, as nitrate of soda itself had a tendency to act on the albumen.

Mr. COOPER'S bath, with nitrate of soda, discoloured very fast.

Mr. PRICE found no discoloration.

Mr. BLANCHARD remarked on the singularly diverse experience which the subject presented. In his own establishment, discoloration in the bath was a thing almost unknown for two years past; but on trying the nitrate of soda the bath did discolour, but he did not notice any solution of the albumen. He added about 10 grains of nitrate of soda to each ounce.

Mr. WHARTON SIMPSON said that, in regard to few subjects had such discrepant experiences been recorded as in relation to the use of nitrate of soda. He had, during the nine months which had elapsed since its use was first proposed, received a large number of communications on the subject, relating experiences quite as diverse as those just recorded. In the majority of instances, the result was favourable, but there were many in which similar failures to those of Mr. Cooper were recorded. He was strongly of opinion that this discrepancy arose from the use of different materials. It was probable that many samples of nitrate of soda were very impure. Like causes ought to produce like results; and, since results differed, the materials used must have differed also.

Mr. HENDERSON thought the difference probably due to the paper.

Mr. SIMPSON said that varied samples of paper would probably make some difference; but there was one circumstance which made it probable that the nitrate of soda was the cause: Mr. Cooper and others stated that they used varied samples of paper with the same result, they never by chance met with success. Now it was probable that they used the same sample of nitrate of soda throughout, and that they who were successful used the same sample for all their successes.

Mr. DAVIS said that this was probable. In his experiments, where the albumen did not dissolve, the nitrate of soda was pure, being some he had in his laboratory for test experiments of another kind.

Mr. HENDERSON had used it pure, and had never found any trouble. He found a solution of nitrate of soda alone dissolved the albumen. He then tried a solution of 5 grains of nitrate of silver alone, and that dissolved the albumen. He next added 55 grains of nitrate of soda to the 5-grain silver solution, and the mixture did not dissolve the albumen.

Mr. SIMPSON referred to the accumulation of nitrates of soda and ammonia in old baths, and the superiority of old baths to new.

Mr. PRICE had used a bath with 20 grains of nitrate of silver and 40 grains of nitrate of soda, without perceiving any difference. With a 20-grain silver solution alone he had obtained very brilliant prints, and deep bronzing in the shadows.

Mr. MARTIN made some confirmatory remarks.

Mr. PRICE had also tried some paper with 60 grains of nitrate of soda to each ounce of albumen, without perceiving much advantage.

Mr. BLANCHARD had not seen any special advantage in his use of nitrate of soda. He thought the advantage was really in the use of weak baths, which, with the class of negatives and the quality of paper now in use, unquestionably gave better prints in his experience than baths of the strength at one time used.

Mr. COOPER called attention to some illustrative prints, one excited on a 40-grain silver bath, and the other on a 35-grain silver bath, with 40 grains of nitrate of soda; the former, he thought, decidedly best.

Mr. HENDERSON had just had a ream of paper prepared with 60 grains of nitrate of soda and 10 grains of chloride of ammonium to each ounce of albumen. He would have pleasure in supplying Mr. Cooper with a few sheets for experiment.

Some further desultory conversation on the subject followed, in the course of which Mr. Henderson remarked, that it was important to avoid over-toning when nitrate of soda was used.

Mr. SIMPSON said it was clear that at present it was desirable to get more facts before coming to a conclusion, and also to make experiments with a pure and uniform article. In the mean time, the question of weak or strong baths was a much more tangible question. The terms were, unfortunately, used too loosely. Weak and strong baths were spoken of as though they were definite things, when the truth was, weakness and strength were purely relative, and could not be considered apart from the amount of chloride in the paper. With a paper salted with 5 grains of chloride a 40-grain bath would be relatively strong; whilst with a paper salted with 20 grains of chloride, a 60 or 80-grain bath would be weak. He concluded by some observations on the best relations gleaned from practical observation. (See article on the subject in our last.)

Mr. BLANCHARD observed, that the tendency in the present day amongst makers of albumenized paper was to reduce the quantity of salt from the old standard.

Mr. HART used from six to eight grains to each ounce of albumen solution.

Mr. PRICE said that he understood the paper which he had been using contained 10 grains.

Some further conversation followed, in which several members said they would have been prepared with results if they had known that the subject of nitrate of soda was to be discussed. The matter then dropped.

Mr. COOPER then read a short paper on the "Use of Formic Acid" (see p. 41).

Mr. DAVIS had made some experiments, chiefly comparing the action of formic acid with a brome-iodized and a simply iodized collodion. He had taken a good plain collodion, and added the usual proportion of iodide of potassium, about four grains to the ounce, using no bromide. With this collodion, and a developer of pyrogallic and formic acid, after Mr. H. Claudet's

formula, both Morson's and Hockin's formic acid being tried in their due proportions, measured according to their acid strength, he found no advantage in rapidity over bromo-iodized collodion and iron development, whilst the deposit was more granular and less delicate than with the latter. It had been asserted that a simply iodized collodion was necessary; but using such a collodion and another containing 4½ grains of iodide of cadmium and 1½ grains of bromide of cadmium, he found the bromo-iodized collodion best. He had tried a neutral bath, and one with nitric acid, but in no case obtained such good results, or so rapid, as by the use of bromo-iodized collodion and iron development.

Mr. Cooper made some confirmatory remarks. He had found that, with iodized collodion and pyrogallic acid, formic acid was an accelerator, but that still better results were obtained with bromo-iodized collodion and iron development, and the best of all with the latter and formic acid.

Mr. Foxlee had tried Mr. Claudet's formula, and found he gained a great advantage in time, one-third of the exposure being necessary; but he could not get good negatives—they were granular and dirty.

Mr. Martin said Mr. Leake's experience was similar.

Mr. Blanchard had tried formic acid with his other materials as usual. On applying the developer, for a little time no image appeared, but at last flashed out suddenly; but the image was thin, and intensified unwillingly, and then seemed hard, and possessed fewer gradations, however well exposed, than an ordinary negative, with bromo-iodized collodion and iron development. There was, moreover, a tendency in all cases with iodized collodion to be deceived in the negative. It would flash out and give the appearance of thorough or even over exposure, but no amount of development would bring out proper detail in the shadows.

A conversation followed, in which Mr. Martin remarked that it was thought by some high authorities that any accelerating influence in formic acid was due to an impurity it often contained, in the shape of an organic radical, and that the pure acid would have no accelerating influence.

Mr. Davis remarked that the small proportion of real acid present in the developer, when formic acid was used, doubtless, was one element to be remembered; as in the usual proportion of acetic acid used there was a very much larger restraining power.

After some further conversation, the subject dropped, and the proceedings terminated.

Photographic Notes and Queries.

Photographers' Life Assurance.

Dear Sir,—In thinking over the causes which make it necessary to form a testimonial fund, it occurred to me, as I dare say it has also to you, that perhaps the time had arrived for the establishment of a life assurance on the mutual principle, a branch of which could be so made as that a person could take up a policy for an annuity, to be taken up at a certain age, or otherwise.

Other professions have their life assurance offices, such as the law, medical, clerical, and, I believe, those persons who call themselves *the* artists exclusively have theirs. Why should not photographic artists have their own life assurance office?

There are as able men to be found among photographers to act as directors as among any other class, and the profession is certainly large and influential enough to form a most flourishing society. Provided it could be introduced in an attractive form, I should not object to take shares, and also to take up a policy, although already assured in two offices. My idea is that we should be like the boy who always carried an armful of umbrellas; when asked what he was going to do with them, he replied, his father always taught him to prepare for a rainy day.

If you think the time is come, it will give me great pleasure to watch its progress in your admirable journal.—I am, your obedient servant,

J. Bateman.

51, *St. George's Street, Canterbury,*
Jan. 16th, 1864.

Photographic Exchange Club.

Sir,—No one seems likely to emulate the example of Curtius, and hurl himself into the gulf which has appeared in the life of the Exchange Club. Is this present state of torpor to eventuate in decease, or is the club, Phœnix-like, to arise from the ashes, a younger, stronger, and better bird? Seriously, can no plan be hit upon, so that those pleasant interchanges may again take place? During this dull time, photographers must have plenty of leisure to discuss plans, and also to propose fresh ones. If all else fail, can we not go back to the original system?—Yours &c.,

One of the Club.

[We think that the old plan had better be tried again. But our columns are open to suggestions.—Ed.]

South Light.

Sir,—In reading your notice of "Glass Rooms with South Light," I thought I would venture to ask you one question, viz., whether a glass house built with a southern aspect would do for England? In America, I believe, the atmosphere is very, very clear, especially in summer, therefore, I do not think it would do for this climate, considering how frequently the light changes in a day, to say nothing of large "watery clouds" floating about at times. Would you kindly favour me with your opinion? There is one thing to be said with regard to Mr. Bogardus's glass room, the glazing is double, and the sashes of *blue* glass (within) are moveable.—Yours respectfully,

David Duncan.

42, *Gardner Street, Brighton, Jan. 16th.*

[We inserted the description of Mr. Bogardus's south light rather as suggestive than as available, in the form described, for this country. In the United States there is a prevalence of clear sunshine, much less interrupted by fogs, clouds, &c., than in this country. If the idea were adopted in this country, it would require considerable modification.—Ed.]

Short Weight in Chemicals.

Sir,—Having seen two or three letters in your News, respecting the frauds practised on the public by the sale of tubes of chloride of gold, containing far less than they are stated and advertised to contain, I beg to bring to your notice similar frauds, which we have to put up with in purchasing nitrate of silver, imported here from *most respectable* houses at home. The bottles are packed, sealed, and marked, so, it is said, expressly for India, and sold as containing 1 ounce each, whereas, in fact, the quantity is far oftener under 400 grains than over.

That *respectable* houses should resort to practices so dishonourable, is indeed much to be regretted, and ought, if possible, to be suppressed. Goodness knows the difficulty of obtaining chemicals of ordinary purity, even in India, is difficult enough (nitrate of silver being one of the most important, and frequently the least pure), without our being cheated in this manner.—Yours truly,

E. Leggete.

P. S.—I enclose the names of the houses whose marks were on the several quantities of silver which I found deficient in quantity, and leave you to make what use of them you please.

[That impure samples of chemicals are occasionally sent out to foreign markets, we have before been informed: but we should not expect such a practice from respectable houses; still less should we expect dishonesty in weight. The names you mention ought to warrant both honest quantity and quality. Possibly their names are used without warrant. The new Act for preventing the use of fraudulent trade marks will probably prevent many such frauds.—Ed.]

Talk in the Studio.

"The Art-Student."—A new monthly periodical under this title will, we understand, be issued on the first of next month, to be conducted by a gentleman whose name is well known to photographers, Mr. A. H. Wall. It is intended to do, in some measure, for the fine arts generally, what photographic journals have done for photography; to supply not only intelligence in regard to their progress, but to furnish the student with aids to study, and afford information regarding the principles and practice, the æsthetics and technics of his art. Painting, sculpture, architecture, engraving, photography, music, the drama, and all subjects relating to art or interesting to artists, will be duly represented. Wood engravings of high class, and other illustrations, will form an important feature. We think

there is ample scope for such a work; and so far as we are acquainted with the programme, we think that the proposed magazine will, in many respects, worthily fill the existing opening. We commend it to the attention of those of our readers interested in its objects.

LARGE CRADLE BATH.—We recently had an opportunity of examining a very noble cradle bath, well contrived, and excellent as a piece of workmanship, made by Ottewill, Collis, and Co., for the South Kensington Museum. It is intended for plates thirty-six inches square, the total dimensions of the bath being about 72 inches by 42 inches, and about 10 inches in the deepest part. It consisted of a mahogany frame lined with plate glass, suspended by a centre at each side on a suitable stand. The bottom consists of one immense plate of glass, bent at a little more than one-third from the end to form a very obtuse angle. When in use, the longer end will be elevated, throwing all the silver solution to the other end; the collodionized plate is then placed flat in the longer half of the bath, that is then depressed with a steady motion, when the solution from the other end will flow in one wave over the collodion film. A steady undulatory motion may then be communicated to the bath without effort.

A SAD PORTRAIT GALLERY.—It is stated that in some towns on the Continent orders have been given to obtain the portraits of all "unfortunate" women to attach to a registered list for identification.

To Correspondents.

A BEGINNER.—The proposed dimensions of your glass room are decidedly too small. If you cannot conveniently have more, the length will do; but 5 feet wide will never do; it must at least double that, or more. The general arrangement of glass will do; but you may have a greater space opaque over-head. Read the article on the subject in our YEAR-BOOK, just issued.

W. S. B.—The patent blinds, to which we recently referred, are not for use outside, but inside the room. The patentee is Mr. McLachlan, of Cross Street, Manchester.

H. THOMPSON.—The general plan of your glass room is very good, and the position also. We think the window on the south-west side and roof a decided advantage; it will be valuable in dull weather, and the direct sunlight may be stopped out by blinds. Possibly it would be well to use corrugated glass for that side, which will help to diffuse sunlight without stopping out much light. The dimensions are very good. There will be no disadvantage in having the dark room and printing room in one, if properly divided by a partition.

PHILIP BUSTER.—The amount of enlargement possible without offensive loss of definition will depend much upon circumstances. If the negative be very well defined throughout, it will bear an enlargement of three or four diameters, without offensive loss; and if it be well enlarged, the result will probably be as satisfactory as if it had been taken direct with a large lens. But all depends upon the negative being suitable, and the enlargement well done.

H. C. M.—The best possible material for a background to roll up is woollen cloth; this cannot crack. If you paint one in distemper, its suitability for rolling will depend much on the sizing material added to the colour; glue and treacle—we cannot state the exact proportions—are useful in such a case. Mr. Gulliver gave a recipe in our columns some time ago for a *soap flatting*, which we believe does not crack. We repeat the recipe—Take white lead, lamp-black, and Venetian red, ground up in as little oil as can be used, and mix with turpentine, using proportions which give a mouse colour. Now take one ounce of common yellow soap, and cut into shavings, to which add six ounces of boiling water, and stir until it is dissolved. To this add a pound and a half of the paint, and mix quickly; when cold, paint the calico intended for a background with it. There is no danger of cracking. The calico must be stretched on a frame for painting. The exact colour is a matter of taste and judgment. If you want a light background, increase the proportion of white lead—if dark, the proportion of lamp-black. The canvas is often sized before applying the colour; but with this preparation you need no preliminary preparation, but two coats of colour will sometimes be desirable.

A BEGINNER.—The lens you describe is an ordinary portrait combination. The front lens, which you fancy consists of one glass, really consists of two cemented together, forming one achromatic lens. If it work well, it will probably answer your purpose as a beginner; if not, get the dealer to supply another of the same kind. It is very probable that the dealer you name will supply you satisfactorily with chemicals.

H. B.—It is difficult to state which is the best dark tent, as much depends on the kind of work for which it is intended. The one to which you refer is a very good one indeed.

N.—We quite agree in the principle you lay down; its truth, as a principle, cannot be disputed. We only differ as to the general practice, which, at least in this country, we believe to be as we have stated it. We fully grant its imperfections.

DODGE.—There are no works especially on the subject of development printing. We believe that the bulk of the information on the subject has been published in our pages. On p. 507 of our fifth volume you will find an account of the method of Blanquart Evrard, who is *facile princeps* in that method.

J. A. L., Bath.—We cannot speak with the certainty of experience of either. It is probable that either will be pretty good. 2. We have tried 2, 3, and 5, and found each good; and have heard good accounts of the others.

A FOOL.—We have no knowledge whatever of the truth of the assertions contained in advertisements in our pages, and are in no wise responsible for the statements. Nevertheless, we should be very sorry to aid in dishonesty, and if any definite case be brought under our attention, we will prevent its recurrence; but our correspondent must see that anonymous statements do not help us at all in the matter.

X. Y. Z.—A gas-light with an orange glass shade may be used in the dark room, but care must be used, as the escape of any trace of gas will be injurious.

D. L.—We prefer a triple to a single lens for general purposes; it is especially desirable for architecture. For landscapes only, a single lens will probably answer as well. The triple will work satisfactorily with a larger stop than the single lens. A landscape single lens for 10 by 8 ought to work with a half-inch stop; but the proper mode of focussing is not on distant objects. The principal object should always be best defined, and that will generally be in the foreground. Good lenses may sometimes be purchased second hand, but we cannot help you to any certainty. We should have the greatest confidence in A.

A. PAYNE.—Mr. Rejlander's address is 7, St. George's Terrace, Malden Road, Haverstock Hill.

J. W. S.—So far as we know, yes; but we cannot speak from personal experience.

CHEMICUS.—We should select either No. 2 or No. 4. It is probable that either will answer your purpose.

T. B. S. We have often described the method of recovering silver from old fixing solutions. Precipitate it, as a sulphide, by the addition of sulphide of potassium, and then reduce in a crucible. You will find working details in our YEAR-BOOK, just issued.

W. BARTHOLOMEW.—We should almost fear that the negative is too intense for successful enlargement; but you will ascertain best by trying. Take care to give the transparency sufficient exposure, and get it full of detail. The dog is very fine. 2. Experiment alone will determine the practical value of M. Poitevin's discovery; but it is undoubtedly very interesting.

ORWELL, AND THOMAS R. LANE.—Received, and shall have attention in our next.

Several Correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already received	111	12	8
Messrs. Ross and Thomson, Edinburgh	5	5	0
Elisha Mander, Esq.	3	3	0
J. A. Spencer, Esq., Shepherd's Bush	3	3	0
W. Peters, Esq.	2	0	0
Employés in Mr. T. R. Williams' establishment	2	0	0
Robert Slingsby, Esq., Lincoln	2	2	0
Collected by J. Atkinson, Esq., Liverpool:—	£	s.	d.
J. Atkinson, Esq.	2	2	0
W. Keith, Esq.	2	2	0
H. Newton, Esq.	1	1	0
J. Lee, Esq.	1	1	0
Mr. Millichamp	0	7	6
E. S.	0	5	0
G. Peverelli	0	5	0
A. Forrest	0	10	0
J. G. Lewis	0	5	0
Mr. Rattray	0	5	0
	8	3	6
James Low, Esq.	0	10	6
W. Hoasley, Esq.	0	2	0
P. Skeoian, Esq.	1	1	0
Gwyn Collier, Esq.	0	5	0
J. W. Pickering, Esq.	0	5	0
Miss Strode	0	2	6
H. H. Clarke, Esq., Ripon	0	7	6
E. R....	0	4	0
W. Austin, Esq.	0	5	0
— Lane, Esq.	0	2	6
G. W. O.	1	1	0
Thomas Brown, Esq., Maryport	0	10	0
R. Cade, Esq., Ipswich	0	10	0
Webber and Blizard, Taunton...	1	1	0
Photographic Workman	0	2	6
George Smith, Esq.	0	10	0
A friend	0	2	6
Hypo	0	2	6
W. Bartholomew, Esq.	0	7	6
B. J. Sayce, Esq.	1	1	0
Henry Newton, Esq.	1	1	0
Henry Vicey, Esq.	1	1	0
F. C. Earle, Esq., Worcester	1	1	0
J. Bateman, Esq., Canterbury	1	1	0
E.C....	0	5	0
Frederick Snary, Esq.	0	10	0
G. B. Davies, Esq.	0	2	6
	£181	3	8

Photographs Registered during the Past Week.

MR. LOUIS DOLIBO, 24, St. George's Road, Brighton,
Two Photographs of Rev. S. Latter.

MESSRS. LAMBERT WESTON AND SON, Waterloo Crescent, Dover,
Photograph of the Right Hon. the Lord Henry Paget.
Photograph of the Right Hon. the Lady Florence Paget.

MR. FRANK G. MORGAN, Petworth, Sussex,
Photograph of Lord Leconfield.

MR. JOHN PORT, 27, Union Street, Stonehouse, Devon,
Drawing representing the Bible open, with Emblems.

MR. GEORGE GREAT REX, 5, Clarendon Terrace, Southampton,
Photograph of Miss Melsonby as *Hafed* in "Lalla Rookh."

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 282.—*January* 29, 1864.

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LIGHT IN THE STUDIO: A SUGGESTION FOR ITS MANAGEMENT.

We commence with two or three propositions which will not be disputed.

First—All light, direct or reflected, entering the studio, ought to illuminate the sitter, the background, or the accessories; in short, all the objects to be delineated in the picture, and nothing else.

Second—That no light, direct or reflected, should enter the camera, except that proceeding from the illuminated objects which are required to form the picture.

Third—That as light always travels in straight lines, and as only those which reach the glass at right angles pass directly through, all others being more or less thrown off by reflection, it follows that the greater portion of the light entering most studios does not reach the sitter, but passing through the glass to the portion of the room opposite to it, is thence reflected in a variety of miscellaneous directions.

To illustrate the last proposition further. If a room had a flat glass roof, the greater portion of the light passing through it would reach the floor, immediately under it, from whence it would be reflected in different directions, Photographic studios are not made with flat glass roofs, and therefore they avoid the evil of wasting light and getting troublesome reflections arising from such a source. And in just such proportion as the top light, intended to reach the sitter, passes through the glass skylight at right angles, is its full benefit obtained. But the majority of photographic studios are made rectangular in shape, having parallel sides, if they have not flat roofs. The greater portion of light, therefore, entering at a side window, passes direct through to the opposite side of the roof, and, if there be another window opposite, part of the light passes out again, and part is reflected. If there be no window opposite, it is partially absorbed and partially reflected, according to the character of the surface on which it falls. The light reflected may fall partially on the sitter; but probably just as much of it falls on the lens, and passes into the camera to spoil the shadows of the picture.

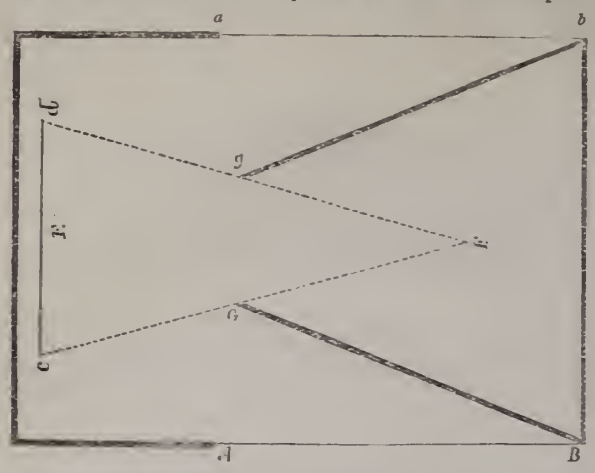
The amount of mischief effected by the presence of unnecessary direct or diffused light in the shadows, is not easily estimated, especially with a sensitive surface, so delicately sensitive as that obtained where bromo-iodized collodion and iron development are used, by which every radiation of every kind is at once rendered apparent. In this class of negatives, moreover, clean transparent shadows are of vital consequence. There was a time, it is true, when a little diffused light reaching the sensitive plate was considered useful. It used to be a secret "dodge" of some operators, in order to secure a rapid portrait of a baby on a daguerreotype plate, to expose the sensitive surface for a moment to diffused light, before placing it in the camera. And with that process the dodge was, to a certain extent, successful. A delicate sketchy-looking picture was produced, with no blacks, and wanting in relief and vigour, but well enough suited to the infantine character of the model. It was, at one time, gravely proposed by a French *savant*, to whitewash the interior of the camera, in order to shorten the exposure. But the veriest tyro in the collodion process, as at present worked, knows the importance of keeping his deepest shadows clean and free from deposit. The more experienced operator knows full well, that in order to keep them clean and bright, he must avoid diffused light or reflected light from entering his camera. To this end various contrivances have been applied: dark chambers or tents in which to place the camera; large projecting hoods or dark boxes in front of the lens; diaphragms covered with black velvet inside the camera, between the lens and sensitive place, &c.; all have been tried, and with considerable success.

But there are other difficulties caused by this unnecessary light, which are not removed by these contrivances. The multitude, uncertainty, and uncontrolled character of the minor reflections falling upon the sitter, are a source of difficulty which is, perhaps, little noticed; but nevertheless, these reflections must often be injurious. But a much more serious disadvantage, and one often distressingly felt, especially in large towns, is that produced by having to work through an illuminated atmosphere. If smoke, or mist, or dust be present in the atmosphere to any appreciable extent, these reflect light; and if a large body of unnecessary light pass through the room, this smoke or dust, or moisture in the room will reflect a large amount of light, and render it almost impossible to obtain clean shadows or brilliant well-defined pictures. This body of illuminated atmosphere is especially distressing, when lenses of long focus are used in order to do justice to standing card portraits, so much so that we have known photographers in some localities compelled, when the atmosphere was not clear, to resort to the use of lenses of short focus, simply to get nearer the sitter with the camera, and thus have a less extended body of atmosphere reflecting light between the lens and the sitter.

We propose, by a very simple arrangement, to remove the greater portion of these evils Our suggestion will be best understood by a reference to the diagram on next page, representing the ground plan of an ordinary rectangular glass room, opaque at each end, and at a portion of the sides, the opaque parts being represented by the thick lines, and the glazed part by thin lines.

The sides A B and *a b* are glass, and the ends and part of sides, as we have said, opaque; of the roof we shall speak shortly. The background is represented by the line *c d*, the sitter being placed at E, and the camera at F. The dotted lines *c* F and *d* F, define the boundaries of the cone of rays proceeding from the objects to be delineated to the camera. We now come to the arrangement we propose: the lines G B and *g b*, are to indicate the position of a couple of screens, so placed as to shut out of the studio all, or nearly all, rays of light which do not reach the sitter. These screens should be black on the side next the camera, which will virtually then be placed in a large dark room, no light reaching it but that reflected from the objects to be delineated. The opposite side of each screen may be white, and thus aid somewhat to illuminate the background. &c., by reflection. The screens should be made to run easily on

castors, so that their inclination towards the centre may be varied to suit varying circumstances. If a group require to be taken, they will be pushed a little further apart;



where a single figure only is required, or where a lens of short focus is used, they will be pushed closer together. The exact position they should occupy will always be easily ascertained, by observing that they just form a border to the amount of picture required, as indicated on the ground glass. They may be fixed and hanged at the end B *b*, or not, as the photographer may find convenient. For the roof the same arrangement may be thus applied: a light frame, covered on the under side with black, and on the other side with white, may be attached to the roof at the camera end with hinges, and a cord and pulley attached to the other end, to allow the screen to drop to the right position, to shut out light from the camera, but allow it to reach the sitter, thus controlling the direction of the top light in the same mode as the side light.

This arrangement will be as simple and inexpensive as it will, we conceive, be efficient in practice, and it may be readily applied to most existing glass rooms. A system has come much into vogue lately of constructing photographic studios with a long dark passage for the camera, in order to obtain the same objects our arrangement is intended to secure. That method has advantages and disadvantages. Its chief advantage is that it does, we believe, secure the end in view; its chief disadvantage is that it is only available in building a new studio, being of no use to those photographers whose glass room is already built. But it has some other disadvantages in the eyes of many. The design is somewhat inelegant: one gentleman, at the South London Photographic Society, recently remarked, that such studios "rather reminded him of a run for hens than anything else." Such a form certainly limits the convenience of a studio, and removes the facilities for the picturesque arrangement of handsome furniture, now frequently met with in the studios of first-class professional photographers. The arrangement we propose presents no such difficulties. It is equally applicable to those already built, and to those to be built, and it will not interfere with either the form or arrangement of the room. If instead of each screen consisting of one piece it be hinged in the middle, still more control might be obtained over it as a reflecting surface, and valuable results be obtained in the shape of reflected lights under specific control. These uses will, however, suggest themselves to the thoughtful photographer without further detail or remark on our part.

AURO-CHLORIDE OF SODIUM.

BY GEORGE PRICE.

In the sixth edition of "Hardwich's Manual of Photographic Chemistry," p. 230, we are told that, "Auro-chloride of sodium. Na Cl Au Cl_3 + 4 Aq, is a *double chloride* of gold and sodium. Every photographer knows that a something is sold under this name; if, however, the purchaser be ignorant of chemistry, or has neither time nor inclination to investigate the matter, he perchance does not know what this *something* is and therefore naturally concludes that he is in possession of the article signified by its name.

In the ninth edition of "Fownes's Manual of Chemistry," p. 266, the metals are classed in isomorphous groups; the seventh group consists of *sodium, silver, gold, potassium,* and *ammonium.* After these groups, we read:—"There is a law concerning the formation of double salts, which may now be mentioned: the two bases are never taken from the same isomorphous family." If this be true, *we cannot have a double salt of gold and sodium.**

Let us suppose, for the present, that there really *is* such a salt as a double chloride of gold and sodium; it is easily shown that what is sold under that name is not what it is professed to be, but is a *highly adulterated article.* The atomic weight of gold is variously given, even in recent works, as 196, 196·6, and 197; we will take it at the *lowest,* thus giving the manufacturer the benefit of a half, or a whole grain, if the atomic weight be *higher* than 196.

According to the formula of this presumed double chloride, its atomic weight is 397; therefore, in 60 grains we should have $45\frac{3}{397}$ grains of chloride of gold, $8\frac{33}{397}$ grains of chloride of sodium, and $5\frac{171}{397}$ grains of water of crystallization. As the vendors, however, state that two grains of this compound are equal to one of chloride of gold, and charge the same price for these proportions, they virtually confess that only 30 grains of the latter are to be found in 60 grains of the former; whereas, *if it were what it is represented to be,* it should contain a fraction more than 45 grains. As the purchaser receives only two-thirds of this quantity, the other third is adulteration; and this being 15 grains out of 60, he buys an article, which, from not being what its name purports it to be, *is actually adulterated to the extent of one-fourth.* What guarantee have we that the adulteration is not greater than this? as *un*adulterated chloride of gold is seldom sold—even at reputed first-class houses—should we not be perfectly warranted in believing that even the large amount I have shown to exist in this so-called chloride of gold and sodium, *is very much exceeded.*†

"Watts's Dictionary of Chemistry," now in course of publication, referring to a crystallized salt formed by the "molecular union of normal binary compounds, such as Na Cl and Ag Cl," says:—"These bodies cannot be proved to exist except in the crystallized state, and the chemical properties of their constituents are not modified to the extent which usually accompanies true chemical combination." And afterwards, when again alluding to this supposed

* We cannot explain the singular remark quoted from Fownes; but it is clearly an error. Double salts are constantly formed from bases belonging to the same isomorphous group. Limited as is the number of salts formed by gold, there are, in that number, several double salts formed by other metals in the same isomorphous group. Sel d'or is a double hyposulphite of gold and soda. Brande, in the last edition of his chemistry, says, speaking of the auro-perchlorides:—"These are compounds in which the chloride of gold is combined with certain electro-positive chlorides, such as those of the alkaline bases: they consist of one atom of perchloride of gold and one atom of the other chloride, and may be formed of their respective chlorides in such proportions." And he further adds:—"It is in consequence of the formation of these soluble double salts that a solution of perchloride of gold in hydrochloric acid yields no precipitates with the alkalies even when added in excess." It has been suggested that Fownes' rule might be admitted by supposing that gold, so dissimilar in many respects to sodium, is possibly placed erroneously in the same isomorphous group, but this does not meet the case, as two metals so similar as sodium and potassium, both in the same group, really form double salts, as in the well-known and beautifully crystallized salt the double tartarate of potassium and sodium.—ED. PHOTO. NEWS.

† If the double salt were sold in perfectly formed crystals it would contain the proportions indicated; but commercial samples of the double salt are generally granular in structure, in which state they may contain a large proportion of free chloride of sodium. The only guarantee the purchaser can have in such case, that he receives the amount of gold for which he pays, is the respectability of the vendor. One simple test may, however, be applied as follows:—Dissolve the bulk of auro-chloride of sodium in water, and observe the result carefully. Chloride of gold is much more rapidly soluble than chloride of sodium; and where there is much excess of the latter present, a yellow solution will be quickly formed by the chloride of gold, and white crystals of common salt may be observed lying at the bottom of the vessel.—ED. PHOTO. NEWS.

double chloride of silver and sodium, a significant "*little crooked thing that asks questions*" is appended to its formula, thus, Na Ag Cl_2 (?); and we are told "there is reason to believe that all such bodies are not, strictly speaking, chemical individuals, but that they are combinations of entire molecules, as such, held together by a force analogous to that which causes certain salts to combine with water of crystallization. This view may easily be admitted, because they cannot be proved to exist except in the crystalline state; being generally decomposed by solution in a moderate quantity of water, they are often not very constant in the proportions of their ingredients, and the two salts, of which they may be regarded as made up, retain their usual properties without essential alteration."

As silver and gold are in the same isomorphous group, does not the preceding quotation apply equally to the salt Na Au Cl_4, and thus lead us to form the same conclusion as the law does, which I have quoted from Fownes, viz., that *there is no such chemical compound as a double chloride of gold and sodium?*

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RESEARCHES ON POSITIVE PRINTING.

BY MM. DAVANNE AND GIRARD.

TONING.*

§ 4TH.—ALKALINE TONING.

BESIDE the methods already passed in review, there has been produced, of late years, a new class of processes, which photographers are in the habit of grouping together under the name of *alkaline toning*. These processes rest upon the addition of a variable portion of substances possessing a slightly alkaline reaction, to the ordinary baths of chloride of gold.

To the carbonate and bicarbonate of soda, first proposed to this end, there have been added during the past six years, phosphate of soda, acetate of soda, rendered slightly alkaline by fusion, borate of soda, chloride of lime—to which the excess of lime it contains always imparts a slightly alkaline reaction—and, lastly, quite recently, sulphocyanide of ammonium. Hyposulphite of soda itself may be included among these substances.

The result of this study will establish, we hope, that these processes, so different in appearance, may be all brought to one simple expression; and that the tonings termed *alkaline*, in which we recognize so great a practical value, must be, in reality, considered as tonings, the normal condition of which is neutrality, but to which the different modes of their preparation communicate, either a slightly acid reaction—due, not to the presence of the hydrochloric acid contained in the *sel d'or* employed, but to the liberation of the usually weak acid of the salt added—or to a slightly alkaline reaction due to the employment in excess of the alkaline salt which characterizes the process.

But previous to entering upon this inquiry, we must examine if the law of regular substitution, which we have recognized as true in the three preceding cases, holds good in the present case. This is shown in the experiments detailed in the following table. They have been performed by taking as a type the alkaline toning bath recommended by M. L'Abbé Laborde, composed of double chloride of gold and potassium, with the addition of acetate of soda.

TONING AFTER FIXING.

Proofs upon Paper simply Albumenized.

Time of Exposure.	Numerical Order.	Numerical Results.	Results of the Experiments.
2 Hours.	No. 49. Portion not toned.	Grains. Ag ..... 0·111	0 gr. ·020 of gold equivalent to 0·034 of silver (Ag3 for Au2) the toned portion (No 50) should contain 0·111 − 0·034 = 0·077 of this metal; but experiment gave 0·075; we therefore find in this case that the proportion of silver is 0·002 deficit.
	No. 50. Toned portion.	Ag ..... 0·075 Au ..... 0·020 Ag + Au 0·095	

* Continued from page 30.

Time of Exposure.	Numerical Order.	Numerical Results.	Results of the Experiments.
15 Minutes.	No. 51. Portion not toned.	Ag ..... 0·063	0 gr. ·017 of gold equivalent to 0·028 of silver, the toned portion (No. 52) should contain 0·063 − 0·028 = 0·035 of this metal; but experiment gave 0·034; we therefore find in this case that the proportion of silver is 0·001 deficit.
	No. 52. Toned portion.	Ag ..... 0·034 Au ..... 0·017 Ag + Au 0·051	

Proofs upon Paper simply Salted.

2 Hours.	No. 53. Portion not toned.	Ag ..... 0·213	0 gr. ·025 of gold equivalent to 0·041 of silver, the toned portion (No. 54) should contain 0·213 − 0·041 = 0·172 of this metal; but experiment gave 0·169; we therefore find in this case that the proportion of silver is 0·003 deficit.
	No 54. Toned portion.	Ag ..... 0·169 Au ..... 0·025 Ag + Au 0·194	
15 Minutes.	No. 55. Portion not toned.	Ag ..... 0·098	0 gr. ·019 of gold equivalent to 0·031 of silver, the toned portion (No. 56) should contain 0·098 − 0·031 = 0·067 of this metal; but experiment gave 0·063; we therefore find in this case that the proportion of silver is 0·004 deficit.
	No. 56. Toned portion.	Ag ..... 0·063 Au ..... 0·019 Ag + Au 0·082	

The losses of silver exhibited in the last column of this table, the greatest of which does not exceed 4 *milligrammes*, are so small, that we must regard them as errors of analysis, and take no account of them in the appreciation of results, which may therefore be regarded as conclusive. They show that in the present case, as in the corresponding cases of the other methods of toning, the substitution of gold for silver takes place in the proportions required by the atomic laws of chemistry, assuming that three equivalents of silver replace two equivalents of gold.

When the toning takes place before fixing, the regularity of the reaction is found masked, as we have already seen in two analogous circumstances, by the presence of free nitrate of silver on the proof. This is shown in the following table:—

TONING BEFORE FIXING.

Proofs upon Paper simply Albumenized.

Time of Exposure.	Numerical Order.	Numerical Results.	Results of the Experiments.
2 Hours.	No. 57. Portion not toned.	Ag ..... 0·172	0 gr. ·025 of gold equivalent to 0·041 of silver, the toned portion (No. 58) should contain 0·172 − 0·041 = 0·131 of this metal; but experiment gave 0·138; we therefore find, in this case, that the proportion of silver is ..... 0·007 excess.
	No. 58. Toned portion.	Ag ..... 0·138 Au ..... 0·025 Ag + Au 0·163	
15 Minutes.	No. 59. Portion not toned.	Ag ..... 0·065	0 gr. ·017 of gold equivalent to 0·028 of silver, the toned portion (No. 60) should contain 0·165 − 0·028 = 0·037 of this metal; but experiment gave 0·044; we therefore find, in this case, that the proportion of silver is ..... 0·007 excess.
	No. 60. Toned portion.	Ag ..... 0·044 Au ..... 0·017 Ag + Au 0·061	

Proofs upon Paper Salted only.

2 Hours.	No. 61. Portion not toned.	Ag ..... 0·304	0 gr. ·054 of gold equivalent to 0·088 of silver, the toned portion (No. 62) should contain 0·304 − 0·088 = 216 of this metal; but experiment gave 0·246; we therefore find, in this case, the proportion of silver is 0·030 excess.
	No. 62. Toned portion.	Ag ..... 0·246 Au ..... 0·054 Ag + Au 0·300	

Time of Exposure.	Numerical Order.	Numerical Results.	Results of the Experiments.
15 Minutes.	No. 63. Portion not toned.	Ag ..... 0·095	0 gr. ·025 of gold equivalent to 0·041 of silver, the toned portion (No. 64) should contain 0·195 – 0·041 = 0·054 of this metal; but experiment gave 0·069; we find therefore, in this case, that the proportion of silver is ..... 0·015 excess.
	No. 64. Toned portion.	Ag ..... 0·069 Au ..... 0·025 Ag + Au 0·084	

From the preceding numbers, it results that, in the case where the so-called alkaline tonings are applied to an unfixed proof, this proof contains, when the operations are concluded, a quantity of silver constantly greater than is required by the substitution of this metal for two equivalents of gold. This anomaly has already presented itself at the time we considered the fixings before toning furnished by neutral chloride of gold, or by a proto-salt of gold; and we explained it in these two cases by considering the proved excess as arising, not from the silver remaining on the sheet, but from the gold accidentally deposited by a double decomposition between the toning bath and the nitrate of silver adhering to the sheet. The same cause produces the same effect. In the case of the so-called alkaline tonings, as in the preceding, we may therefore conclude that the replacing of the gold by the silver is effected in atomic conditions, whenever no accessory phenomenon disturbs the regularity of this phenomenon.

We may add, in confirmation of a result well known to photographers, that tonings of this sort proceed with great regularity, that they yield very beautiful hues, that their employment is easy, and it is owing to these qualities that they have become generally adopted at the present day.

Conclusions.

The numerous experiments recorded above, and the comparison of the numerical results contained in the tables, lead us to the following conclusions:—

1st. In all toning processes, when no accessory phenomenon intervenes, the replacing of silver by gold takes place in the atomic proportions required by the nature of the salt of gold employed.

2nd. This replacing takes place upon the portions formed of silver by simple substitution, and upon the portions formed of silver and argentico-organic matter by a double decomposition which forms in the place of the latter a corresponding auric-organico compound, analagous to the combinations which take place in the process of dyeing, between the colouring materials and the organic tissues. We also believe that it is to this auric-organico combination that the proof owes all its brilliancy.

3rd. The replacing of the silver by gold takes place equally upon the darkest portions as upon the half-tones; however, it appears to be more rapid upon the parts slightly coloured, and this result is easily explained by the lesser thickness of these parts.

4th. The deposit of gold is also much more rapid upon a paper simply salted—the picture of which is consequently formed, for the most part, of silver—than upon a paper simply albumenized, the picture of which is, consequently, almost solely formed of a sort of argentico-organic *lake*, upon which the double decomposition we have spoken of above must take place.

5th. A comparison of the results furnished by the four classes of toning processes we have examined above, show that the application of solutions of gold acidulated with hydrochloric acid cannot be performed successfully; that the double hyposulphite of gold and soda does not give favourable results except in presence of an excess of ammonia or by hyposulphite of soda by which it enters the category of alkaline tonings, and that, in fact, it is only in the employ of neutral or alkaline baths that we should seek the practical conditions of toning.

Practical Conditions of Toning.

The first question which, in the photographical point of view, should engage our attention, is this:—Whatever may be the bath employed, should toning take place before or after fixing?

Theory as well as practice clearly show that, in the methods at present employed, *toning must precede fixing*. For, when toning takes place upon a proof already fixed, the gold, in depositing, determines the formation of an equivalent quantity of chloride of silver; doubtless this remains for the most part enclosed within the coloured portions, and does not appear to alter the purity of the whites of the picture. We cannot, however, without danger, leave a substance in the proof, which must strongly blacken under the luminous action, and consequently modify the general tone. A second fixing also complicates the series of washing which then becomes necessary.*

On the other hand, experience shows that the argentico-organic lake which constitutes the picture, on removal from the pressure frame, undergoes, in contact with the fixing solution, an injurious change of hue, and loses all aptitude of recovering in the gold bath the warm and vigorous tones which the proofs acquire when the coloured material has undergone no modification.

This first point established, we next endeavour to determine the best conditions to fulfil in the composition of the toning bath. Between the baths absolutely neutral and those called alkaline there exists, in a practical point of view, an analogy not at first suspected. In fact, what in our eyes characterizes the one as well as the others, and what imparts to them their valuable qualities, so much sought by every one, is, that in one as in the others, the hydrochloric acid is completely eliminated.

When to an acid solution of chloride of gold we add a salt with a weak acid, such as the carbonate, acetate, borate, &c., of soda, the first action of this salt is to abandon its base to the hydrochloric acid, to set at liberty carbonic, acetic, boric, or other acid present in the salt. Hence arises a solution, the essential character of which is no longer to contain free hydrochloric acid, and which presents itself in a state of perfect neutrality, or rather with a slight acid reaction, if the chloride of gold contains much hydrochloric acid, and if the salt added is only a little alkaline, or with an alkaline reaction, if this same salt has been employed in a freely alkaline state, and in sufficient excess.

If we make practical use of the gold baths prepared under these three conditions, we recognize that they one and all can give good results, but with differences in tone and rapidity which leave a very wide margin to artistic appreciation. We have verified this fact in the following manner:—Four baths were prepared—the first with chloride of gold, perfectly neutral; the second with the same chloride, slightly acidulated with acetic acid; the third with the same chloride, freely alkalined by carbonate of soda; lastly, the fourth, taken as the type, constituted the toning with fused acetate of soda, and consequently slightly alkaline proposed by M. l'Abbé Laborde.

Upon placing these baths in the same conditions, we have recognized that the rapidity of toning increases in direct proportion to the acidity, that is to say, that the bath with carbonate of soda is slower than that with acetic acid, and that the hue of the proofs toned and *fixed*, starting with the red given by the acetic acid passing through violet in the perfectly neutral bath, attains in the alkaline baths to a black, deep in proportion to the quantity of alkali present.

It follows from this experiment that the photographer can, at pleasure, place his toning bath in such a condition of acidity (by a weak acid), or alkalinity, or neutrality as he may desire: he has thus a real palette in his hands, which permits him to vary the hue of his proofs at will. The numerous formulæ for toning baths suggested day by day, put forth as new ones, attain no other result than to place, with more or less nicety, the gold solution in one or another of these three conditions.

To constitute a good toning-bath, we must take a suitable salt of gold and add to it a salt capable of modifying the solution in one of the three directions we have indicated. The gold salt will be preferably one of the double chlorides recommended by M. Fordos: commercial chloride of gold, that is to say, the hydrochlorate of gold, $Au^2 Cl^3$, $Cl\,H$, must be wholly banished from photographic preparations: the acid in excess it contains, its deliquescent properties, the facility with which it can be adulterated, are so many reasons why it should be absolutely rejected from photographic operations.

To the double chloride of gold and soda or potassium, we we must add the substance required to complete the preparation, the nature of which will be determined by the aim proposed.

* Only in the case where the toning bath is composed of a gold salt mixed with an excess of hyposulphite of soda this inconvenience disappears; but then the proof becomes exposed to all the accidents arising from the employment of sulphur compounds.

If a *neutral* bath is required, we add to the solution consisting of 1 *gramme* (15 grains) of the double chloride, to 1 *litre* (35½ fluid ounces), a pinch of powdered chalk; then, after stirring it a few minutes, filter it: the bath thus rendered perfectly neutral, and employed alone, will give very fine violet-black tones, varying with the time during which the proof is left in the bath.

If an *acid* bath is desired, after neutralizing and filtering the solution as above described, we add to it some drops of acetic acid, sufficient to slightly redden litmus paper, and we thus obtain a bath which communicates to the proofs a hue which, in contact with the fixing solution, will yield hues red in proportion to the quantity of acid added.

Lastly, if an *alkaline* bath is desired, yielding in consequence hues inclining to black, we add to the solution, without taking the trouble to neutralize it, and until it exhibits an alkaline reaction, some one of the different salts previously proposed. The carbonate, bicarbonate, phosphate and borate of soda, fused acetate of soda, &c., all fulfil this object. Chloride of lime does so also, but we reject its use because the hypochlorite it contains may cause the decomposition of the fixing bath, and also attack the substance of the paper. Besides, this substance acts only through the excess of lime it contains: the hypochlorite in no way contributes, and it is easy to verify this fact by employing, as we have done with success, lime water alone to alkaline the toning bath, and obtain satisfactory black tones.

It is, besides, impossible to give precisely, *à priori*, the proportion of acid or alkaline substance which the photographer should add to his toning bath; experience alone can teach him what are the quantities of each best adapted to produce red hues or black hues; or, if he prefers it, the violet-black hue which the chemically neutral bath yields, and which we must regard as the normal tint of good toning.

M. EUGENE PLACET'S PROCESS OF HELIOGRAPHIC ENGRAVING.

BY M. ERNEST LACAN.

In most of the processes employed hitherto, a material which light renders insoluble is poured upon a plate; after desiccation, it is exposed under a negative to the action of light, when the parts not modified are dissolved away.

The insoluble parts form a relief upon the plate, which, moulded and reproduced by the electrotype process, gives an engraved plate of the design; but this engraving represents neither the delicate portions nor the half-tones of the original.

In the half-tones the light has not rendered the layer insoluble in all its thickness; the half-tones, undermined and dissolved by the solvent, and too weak to resist the washing, are carried away with the subjacent soluble portions; but it is otherwise if we give to the solarised face a suitable support, and if we make the solvent act upon the opposite face. The sensitive material then retains all the half-tones, and the plates thus engraved, reproduced by moulding, have all the delicacy of the model.

The method of operating is as follows:—

We take upon glass a proof from the negative to be engraved, and pour upon it a coating of the sensitive material (bitumen of Judea for example); then expose it to the light, glass upwards, and afterwards immerse it in the solvent (benzine or oil of naphtha). The parts rendered insoluble by light form reliefs in proportion to the quantity of light which has passed through the various parts of the design; then mould this relief, and the electrotype gives metal plates, in intaglio or in relief, according to the nature of the *cliché*, the material employed, and the time of exposure to light.

Bitumen gives an engraving of great delicacy, but in slight relief. For an engraving in relief, it is better to employ the mixture of gelatine and bichromate of potassa or ammonia.

If, after the solution of the soluble portion, the relief seems insufficient, and if this relief is transparent, it can be increased by extending a fresh layer of the sensitive material, and operating again as at first.

Proofs on paper will serve equally well, operating in the same manner, first rendering the paper transparent and impermeable to the solvent. Thus, when we take bitumen for the sensitive material, the paper is rendered impermeable by soaking it in a solution of dextrine, gum, or gelatine, &c. The solvent has no action upon these substances, and, moreover, we can easily free the proof from them when the operation is terminated.

If we do not wish to operate upon the proof itself, we proceed as follows:—

First Way.—The sensitive coating is poured upon a thin plate of glass, mica, gelatine, paper, horn, waxed cloth, or any other transparent body, and exposed on the side of the material serving as a support.

The coagulation then starting from the side which is in contact with the support, the picture, after washing, remains wholly fixed upon this support.

Second Way.—Spread two or three coatings of collodion upon a glass plate, then a coating of bichromated gelatine; when dry cut the edges of the gelatine, and the sheet readily detaches from the plate, bringing the adhering collodion along with it.

It is then exposed, collodion side to the light, under a negative; then upon this collodioned face a plate of metal with a glutinous substance is placed, and passed through a rolling press; the sheet is then found to be perfectly fixed, the non-exposed surface of the gelatine above, and in the necessary conditions to be submitted to the action of the solvent.

A single coating of collodion upon the plate is not always sufficient to detach the sheet of gelatine easily. The collodion may also be replaced by any other substance possessing analogous properties.

After exposure, to give more adherence between the collodion and the support, it is preferable to spread a coating of varnish over the collodion.

Third Way.—Upon a thin, flat, metal plate, spread the sensitive material, bichromated gelatine for example; when dried, apply a coating of collodion, expose it to the light under a negative, then add a new coating of collodion mixed with varnish, or of varnish alone; lastly, pour over it a mixture of wax and resin, of one or two *centimètres* in thickness, or make it adhere to a metallic plate, as in the preceding case.

After cooling, the thin plate of metal may be easily detached, leaving the sheet of gelatine intact and adherent to the support, the non-exposed face upwards. We then proceed as in the preceding case.

The first layer of collodion penetrates the gelatine less uniformly if applied after exposure, for the light renders the parts struck by it less permeable.

We can, with more or less advantage, substitute a great many other substances for the collodion and the mixture of wax and resin. The object of the coating, wax and resin, is to maintain the engraving upon a very uniform ground, and to prevent the collodion from bending, and consequently making the picture distorted. It can be dispensed with by combining several coatings of collodion and varnish, so as to annul the contraction or dilatation of the support.

The solvent acting as said above, upon the non-exposed side, begins by swelling the non-impressed portions, and produces very sharp and beautiful reliefs. In many cases these reliefs may be turned to account: they can be moulded, and after moulding there is nothing to prevent the continuing of the action of the solvent to obtain a second engraving the reverse of the first.

Thus the same sensitive coating will produce two engravings, the one by the swelling, the other by the solution, of the parts remaining soluble.

Besides these two substances, bitumen of Judea and bichromated gelatine, previously indicated as examples, we may employ many animal or vegetable matters, as resin, gum, albumen, gluten, dextrine, caseine, &c., sensitive to light themselves, or which become so when mixed with one or more salts, such as the salts of gold, silver, uranium, chro-

mium, iron, the sulphides, iodides, tartaric acid, oxalic acid, sal ammoniac, &c.

The operations are simplified if we employ a substance which, at first insoluble, becomes soluble under the action of light (mixtures of gelatine, gum, albumen, &c, with a maximum salt of iron joined to tartaric acid; some other substances also enjoy this property).

In this case the solvent acts, commencing with the solarized surface, by hollowing it out in the same way as acid does in copper-plate engraving, but with this advantage, that the solvent gives to each line only the exact value assigned to it by the correspondiug intensity of the *cliché*.

The design obtained as above described—and under conditions appropriate to the use for which it is intended—it may be transferred to suitable surfaces, and act as a reserve, either for engraving by means of acids, for the deposit of metals by the electrotype, or other process.

If vitrifiable materials are introduced into the composition of the sensitive coating, or if we make these substances adhere to the reliefs after their formatiou, we can, whether transferred or not, produce enamels.

We can extend over the entire surface supporting the reliefs a coating of fat ink, then dissolve these reliefs which carry away the ink that covers them: lastly, transfer them to stone or zinc, and proceed afterwards as in ordinary lithography.

Many other means may be employed to render practicable the principles upon which this process of heliographic engraving is based; these principles are summed up by the author in the following terms.

1st. The employment of substances rendered insoluble by light.

Apply the sensitive coating to a suitable support, and on the side which receives the luminous action direct.

Apply the solvent on the opposite side.

Mould, and reproduce by electrotype process, the reliefs formed, either by the expansion or the solution of the non-impressed portions.

2nd. The employment of insoluble substances which become soluble under the action of light.

Solution or expansion of the impressed portions.

Moulding and electrotyping of the reliefs formed.

In conclusion, these processes admit of our obtaining photographic designs in fatty ink without the aid of the draughtsman or engraver, which may be afterwards reproduced by lithography, or as vitrified photographs, or as plates for printing from, &c.; or, lastly, as in every kind o engraved surface applicable to ornamentation.—*Le Moniteur de la Photographie.*

UTILITY OF BOILING THE NITRATE OF SILVER BATH TO INCREASE ITS SENSITIVENESS.

BY M. MC A. GAUDIN.

In photography, sensitiveness is a very precious quality, in connection with the formation of negatives for portraits, and of stereoscopic negatives. This sensitiveness, so eagerly sought by every one, depends upon a very delicate molecular condition, which has not yet been defined. The preparation of the collodion goes for something, but the state of the nitrate bath plays the principal part; and the facility with which it can be immediately modified, has always led photographers to give special attention to it when operations do not proceed successfully. They neutralize it by the addition of chalk, and then filter it. No sooner is it filtered, than microscopic needles of acetate of silver are formed, which cause holes in the negative; this necessitates the addition of fresh acetic acid, and destroys, in part, the effect previously produced by the chalk. The cause of a nitrate bath working well is probably a very complex one. Usually it produces its effect only in a certain time after it has been prepared; and, generally, baths that work well have an aromatic odour, which indicates the presence of an ether, probably aldehyde.

The nitrate of silver, in a bath that works well, is always saturated with iodide of silver; and it is supposed, not without reason, that the sensitiveness of the collodion resides in the union of these two substances; and that, notwithstanding a prolonged washing, there always remains a certain quantity of nitrate of silver rendered insoluble by its union with iodide of silver, and that therein lies the starting-point of the action of light. In a very complete summary of the recent progress of photography (which I have translated from the PHOTOGRAPHIC NEWS for insertion in *La Lumière*), which is much better done than I can do it myself, it states that M. Poitevin has recognized that tannin, united with insensitive iodide of silver, renders the latter sensitive, exactly the same as nitrate of silver does. This is a real discovery, and may lead to very important results. Doubtless, tannin boiled with the insensitive iodide of silver, which I prepared by exposing silver leaf to the fumes of iodine, will not only become sensitive itself, but the filtered tannin will, without doubt, appropriate a portion of this iodide to form a very sensitive liquid. While waiting for an experiment to throw light on this matter, another idea, which I believe to be better founded, suggests itself to me.

I have constantly remarked that the nitrate of silver which I prepared myself, possessed an exquisite sensitiveness compared with that which I bought of dealers in photographic chemicals. From this I concluded that the latter was not perfectly pure. However, I freely admit that the nitrate of silver we now buy at respectable houses is quite free from all injurious addition. I was, therefore, obliged to seek elsewhere the secret cause of this extraordinary sensitiveness, and I believe that I have found it.

Whenever I have myself prepared nitrate of silver, which I necessarily brought to a state of fusion, I never neglected to iodize it with a minute quantity of iodide dissolved in alcohol, but I always took care that an excess of iodide was precipitated; and to make sure of saturation, I boiled this bath to a state of concentration before diluting it with water to the desired point; and this operation, which I performed in broad daylight, always showed me the iodide in suspension becoming browner and browner, and even passing to the metallic state.

What takes place in this case, I do not know, but it is extremely probable that the nitrate of silver, *boiled* with a certain proportion of iodide of silver, acquires a peculiar property, which exhibits itself in an unusual sensitiveness. In any case, by boiling a strong solution of nitrate of silver for a few moments with an excess of floating iodide of silver, before dilutiug it to the desired strength, it cannot fail to be advantageous, and I recommend photographers always to follow this method. For my own part, I shall make comparative trials, to satisfy myself with regard to sensitiveness, and that will be very easy.

I shall prepare a cold silver bath, of the desired strength, with excess of floating iodide, and after well beating them together, I shall separate them into two portions, the one I shall employ without boiling, and the other I shall boil with its floating iodide, and carefully observe the successive hues it assumes in the dark as well as in the light, and I believe that this operation will visibly change the nature of the iodide, both when sheltered from light as when under its influence, and show a certain modification of the silver bath. —*La Lumière.*

RATIONAL SYSTEMS OF WASHING PRINTS.

BY CHARLES WALDACK.*

It has been well proved that positive prints toned with gold salts and afterwards fixed in plain hyposulphite of soda, frequently renewed, do not change in the same conditions in which those, toned and fixed by a single operation in the mixed bath of hyposulphite of soda and gold, become yellow and finally fade completely. From this it must be concluded that the first-mentioned prints are as permanent as any

* *Humphrey's Journal.*

silver prints can be, that is to say, they remain unchanged as long as they are not submitted to the action of sulphurous or other vapours which act on metallic silver.

With these attested facts in view, it is reasonable to feel astonishment at the great number of yellow and faded prints bearing the impress of their future destruction, proceeding from the hands of professional photographers and in the market for sale.

These effects we attribute to two causes:

The first resides in the bath of hyposulphite itself. The prints, after toning, are, without any preliminary rinsing, thrown into the fixing bath, thus introducing salts of gold and putting it in the same condition as the single fixing and toning bath just alluded to. This mode of manipulation would not have the disadvantageous consequences above mentioned, if the hyposulphite of soda were renewed every day; but generally it is employed for several days, and sometimes weeks in succession.

The decomposition produced by the salts of gold, and that resulting from the prolonged use of the bath, superinduce the formation of sulphurizing compounds, so that prints are found in exactly the same condition as those prepared in the various single toning and fixing baths, which were in use before the introduction of separate toning and fixing baths.

The second cause that tends to the destruction of prints is the senseless and frequently negligent manner in which the washing process is performed. The old method, which is still employed by so many photographers, namely, that of putting the prints into a basin and of renewing the water from time to time, is far from being satisfactory, whether the operation be performed either by the hand or an automatic arrangement. Washing prints in a running stream is fundamentally the same thing, and always presents the inconvenience that the prints stick together and the intervening water is not renewed.

Mr. Shadbolt recommends the prints to be taken out of the water from time to time and to be allowed to drain, thus getting rid of the water which they contain. This, of itself, is a step in advance. A system of washing that we have practised for years with success is the one we are about to describe. Unfortunately it is practicable only in cities supplied with water-works. The prints are placed side by side on a piece of sackcloth stretched on a wooden frame. As high as the head, right over a large tub furnished with an outlet pipe, a stopcock is fixed to the water-pipe, and to this stopcock is attached, by means of an india-rubber tube, a perforated cylinder something like those used in watering the streets. The cloth covered with prints is placed in an inclined position in the tub, and then the stopcock is opened. The water falls with some force on the prints, which from time to time are turned over and then back again. From ten to fifteen minutes' washing is sufficient to remove all the hyposulphite.

If it be desirable to combine the system of draining with this one, all that is necessary is to interrupt the washing every five minutes, for instance, and to put the frame in a more vertical position, in order to allow the prints to drain.

The washing process which follows, and which is superior to the preceding, was suggested by a clothes wringer* in the American department at the Universal Exhibition of 1862. This machine, in other respects very simple, is formed of two rollers of vulcanized india-rubber, pressed together by means of two rings of india-rubber stretched around their axes. A piece of blotting-paper, dipped in water and passed between these rollers, leaves them simply in a moist condition and without having suffered the slightest rent. After a print has been pressed in this manner for eight or ten times, taking care to moisten it each time when it leaves the rollers, every trace of the hyposulphite will have been removed. Care must be taken also to wash the press every now and then, by means of a jet of water, or by plunging it into a tub of water.

This system, combined with the one just described, is certainly the best that can be proposed. The following is the practical application.

The press is placed in the tub containing the frame on which the prints are arranged side by side. As soon as the prints have been sprinkled on either side, in order to remove the excess of the hyposulphite which they retain, they are passed, one after the other, between the rollers, and then put back again on the cloth to be again sprinkled and again pressed. These two operations having been performed consecutively for five or six times in succession, the prints are completely freed from the hyposulphite.

Whoever will take the trouble of examining the proposed process will be convinced of its superiority over every other in use. Its employment is simply putting in practice the means made use of in washing materials that can be handled more conveniently than paper.

When washing a sponge we do not put it into a running stream; this would be a long and imperfect process; but without making use of our reasoning faculties, so to say, we saturate it with water, then press it in order to renew the operation. It will be objected that this process of washing is very complicated and requires too much care. To this I may reply, that no washing can be completed without care. In the ordinary processes with running water and by other means, the prints have to be moved about every now and then, and as this mode of washing lasts several hours in order to be effectual, it requires, in my opinion, more care than the one proposed.

* We saw this method tried some years ago, and it proved a failure, many prints being destroyed.—ED. P. N.

HOW TO COPY PHOTOGRAPHS, ENGRAVINGS, &c

BEING SHORT LESSON IN PHOTOGRAPHY.—No. 18.*

COPYING, of all branches in photography, is a branch which tests the skill of the amateur or operator perhaps more than any other. This arises from the difficulty of focussing with accuracy, and of placing the picture or engraving to be copied on a plane which is exactly perpendicular to the axis of the lens, that is, to the line which passes through the centres of the anterior and posterior lenses.

There are two methods of copying, the one by means of the full and direct rays of the sun, and the other by diffused light.

We will describe both these methods, also the means by which the above-mentioned difficulties can be obviated.

The power of the lens and the size of the camera will vary with the size of the picture, print, &c., to be copied.

To be definite, let us suppose you wish to copy stereographs the work of celebrated artists. In this case the one-fourth orthoscopic lens of Voigtlander will be quite well adapted to perform the task, or you may use a pair of stereoscopic lenses for the same purpose. The orthoscopic lens is preferable.

Your camera must be sufficiently long to admit of the necessary extension for equal conjugate foci. For instance, if the principal focus of your lens be 10 inches, the ground glass will have to admit of sliding back until it is 20 inches from the centre of the lens.

Supposing the equivalent or principal focus of your lens be then 10 inches, construct a table 40 inches in length, and wide enough to accommodate the width of the camera and a ledge on either side between which it can slide. These ledges or slips of wood are screwed firmly to the top of the table along the sides.

See that the end of the table is accurately squared, and then screw upon it a piece of board of the width of the table and as high as the camera, so that it forms together with the table an L-shaped figure. This board is fixed accurately at right angles by means of a triangular brace on the left side.

* From *Humphrey's Journal.*

A soon as this is done, place the camera on the table with the tube facing the board on the end; slide the camera up to the board until the brass cap is in contact with it, and then draw a circle all round it with a black-lead pencil. Remove the camera, find the centre of the circle, and by means of a square draw a line through it and perpendicular to the table. Draw a line perpendicular to the preceding line through the same centre both ways, that is, to the right and the left. Divide these two lines into half inches or less, reckoning from the centre up and down, and to the right and left, and number them.

Now measure the length and width of the stereograph mount; suppose these be respectively seven inches in one direction and three and a half in the other. Turn the stereograph wrong side up, and fix it by means of small pins or tacks stuck in obliquely upon the board, so that one end reaches three inches and a half from the centre to the right, and the upper side reaches one inch and three quarters from the same point upwards; the centre of the stereograph will then coincide with the centre of the lens. See that the sides of the stereograph are parallel with the upper surface of the table, and also be very particular that the stereograph lies quite flat.

The next proceeding is to obtain a very sharp and accurate focus, and at the same time a picture of the exact same size with the original. With a pair of compasses, therefore, measure the length of the mount. Draw back the ground glass to 20 inches, fix it there, and now slide the camera back until the centre of the lens is 20 inches or thereabouts from the stereograph, and see whether the picture on the glass is sharp—you require a pair of very sharp-focussed spectacles or a microscope in this sort of focussing—and the ground glass and the collodionized glass must be exactly at the same distance from the lens. If now the picture is quite sharp, which you can determine by sliding the camera on the table backwards and forwards slightly, you measure the size of the picture of the mount on the ground glass; if this is the same as the original, your camera is in the right position, and can be strapped to the table firmly.

If, however, the picture on the ground glass be either greater or less than the original of which it is a copy, not only the camera is not in the right place, but the ground glass also requires a fresh adjustment.

If the equivalent focus of the lens be accurately known then four times this focal length will give the distance between the object and the image, or twice the amount will be the distance of the ground glass to the centre of the lens, as before mentioned.

If the equivalent focus or principal focal length be not known with accuracy, and the picture on the ground glass was too small, but yet in accurate focus, then the *camera was too far off from the object*, and the *ground glass was too near to the lens.*

Consequently draw out the bellows slide until you have a distance of 28 inches beneath the ground glass and the centre of the orthoscopic lens—which is about the proper distance with a lens which we possess of Voigtlander's manufacture—fix it in this position, and then slide the camera backwards and forwards on the table between the projecting ledges until the picture is again in accurate focus.

Measure once more. If the picture be still a trifle too small, proceed as directed until the size of the picture is exactly the same as that of the object. Naturally, if the picture at the first trial had been too large, the camera would have been too near and the ground glass too remote.

This is the first rude adjustment for focussing. Next take a pair of higher magnifying lenses, and, fixing upon some special very definite and sharp point in the original to be copied, as, for instance, a letter on a very distant sign-board, the diamond-shaped divisions of a church window, the divisions in the petals of a flower, or the mesh of some fine net, in fact, on any point which is especially sharp and clear, move the camera *very slightly* backwards and forwards until you are quite satisfied finally that the focus is correctly obtained.

You may now fairly conclude that this operation is correct. Strap firmly the camera to the table; or, if you have much work in the copying line to execute, screw the camera to the table; only you must bear in mind that wood will both shrink and expand by change of temperature, for which allowance must be made, that is, fresh adjustments must be made from time to time where such change is suspected. Where the wood both of the camera and the table is dry, well seasoned, and varnished, this single act of focussing is final. Mark the table along the front edge of the camera, as well as the camera itself, for the position of the bellows slide, in all cases where the same lens and camera have to be used for other purposes.

The best light for focussing, as above recommended, is that which proceeds directly from the sun. The table, therefore, is placed near an open window, which will allow the sun to shine directly upon the stereograph. In this case be very careful that the shadows of the pins or tacks do not interfere with the pictures. Use the smallest stops, for you can afford to do so, the light being so brilliant; by this means you obtain the sharpest definition.

If you intend to use sunlight in the operation of making a negative, you must have windows in your room having different aspects. The morning sun, that is from seven to ten, works by far the best. Be very careful that no light gain access to the inside of the camera, which is very easy when operating in the full blaze of the sun: cover the camera with a dark cloth when you put in the plateholder and draw out the slide; cover the back part of the camera in like manner; keep all these parts covered during the exposure. Remove any and every thing from the front of the camera, such as the focussing glass, metallic cap, &c., that can produce reflections on the picture to be copied. Remove the cap gently, and expose for about two minutes.

The proper time of exposure will have to be learned; it varies with the lens, the size of the diaphragm, and the light. With a pair of one-fourth portrait or stereoscopic lenses and the smallest stop, an exposure of fifteen minutes will in general be sufficient in sunlight.

If you prefer to copy by means of diffused light—a plan which we certainly do not recommend—your plates will have to be quite different. Some operators imagine that sunlight will produce shadows in copying, because it has this effect when we take photographs of solid objects; this, of course, is a great and foolish error, because a flat surface has no prominences which can yield shadows.

Having taken you over the main difficulty of copying, that is, of focussing and otherwise adjusting the copying table; and supposing, furthermore, that you know how to take a negative, to develop it, and to intensify it, we will close our lesson to-day, and leave you to practise in the sun until we see you again.

Follow the rules carefully and faithfully; we will be responsible for your success if you use one of Voigtlander's orthoscopic lenses and an accurately-made camera.

The next lesson will be a continuation of the subject.

Proceedings of Societies.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held at Myddelton Hall, on Wednesday evening, January 20th, G. DAWSON, Esq., in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. C. Ager was elected a member.

The CHAIRMAN announced that in accordance with the rules of the Association, at the next meeting the officers for the year would be nominated.

Mr. GODBOLD then read a paper on the restoration of faded prints, and exhibited a variety of pictures, some of which were contributed by members, as illustrative of his experiments.

At the termination of the paper the CHAIRMAN invited discussion.

Mr. HILL said that he had tried Mr. Godbold's method, but found that it was successful only where the prints had been toned with gold, for on trying the experiment on some old sulphur-toned prints, the results were anything but satisfactory, for the pictures disappeared entirely.

Mr. SHADBOLT thought it could scarcely be called a restorative process, as it appeared to him that the chlorine acted upon the deposit of sulphur on the surface of the print, hence the disappearance of those toned with sulphur only. As, however, gold resisted the action of chlorine more completely, the yellow sulpuretted film was removed, and the picture became brighter in consequence.

Mr. GODBOLD said, in answer to a question, that in those pictures he had experimented upon where the details had disappeared, he had found it impossible to restore them.

Mr. HILL found several he had supplied were much improved by the process.

Mr. BOCKETT asked if the pictures treated by this process were permanent.

Mr. GODBOLD said that several of the pictures before the meeting had been treated by this method three years ago, and had since shown no indication of change; he had found the mercury very difficult to remove from the paper, and as an instance, called attention to a picture in the album which had been acted upon by one of the pictures treated by his method, this was somewhat curious, as a leaf of the book intervened between the two pictures.

Mr. DAWSON said that whenever mercury came in contact with sulphur it was decomposed; he thought that the chemistry of the reactions in Mr. Godbold's method difficult to explain. Assuming that the photographic image was a suboxide of silver, in a faded print, a sulphuret of silver would be formed; by the action of the mercury, subchloride of silver would be formed, therefore all danger of fading would be removed; prints, however, toned by sulphur would be bleached.

Mr. SHADBOLT thought that there was some analogy in the operations of what was called anti-chlor in paper making.

Mr. MARTIN had found that upon putting the prints into a hypo bath, the yellow colour returned.

Mr. SHADBOLT said that the mercury could not have been perfectly removed from the prints.

A conversation here ensued on the action of the print treated with mercury on the picture in the album.

Mr. FOXLEE asked Mr. Godbold if he had tried the process originally described by Mr. Barnes, viz., putting the picture between paper saturated by bichloride of mercury, and afterwards dried.

Mr. SHADBOLT thought it would be well to try chlorine, in order to ascertain if the mercury played any part in the operation.

Mr. DAWSON said the salts of mercury were very complicated in their action, and that the bichloride of mercury would act in a dry state.

A gentleman asked if the peculiar change of the picture in the album was caused by acid gum.

The CHAIRMAN thought not.

Mr. BLANCHARD said that he had tried the method described by Mr. Godbold some years ago, and found the prints so treated quite permanent, but he thought that they became somewhat redder by age; the colour, however, was by no means disagreeable. He had also tried upon some developed prints the bichloride of mercury solution, and the result was the disappearance of the picture. On trying, however, afterwards, diluted ammonia, the picture was restored. The object of the experiments was to overcome the greenness of prints developed by gallic acid. This method completely overcame the greenness, and the colour was a brown of not very agreeable colour.

The CHAIRMAN said the action was the same that brought about in the old method of intensifying negatives with bichloride of mercury and ammonia. He thought the meeting would readily accord a vote of thanks to Mr. Godbold for his very interesting paper.

Mr. SHADBOLT then said that, at the last meeting, he had brought some very interesting stereo pictures, with natural clouds, taken on Fothergill plates. The clouds were so natural that the prevailing opinion was that they were part of the picture. On, however, making inquiry, he found they were printed separately. In reply to him, Mr. Law had favoured him with a few remarks which he would now read.

Here followed the paper, entitled, "Some Experience of a Photographer on the Fothergill Process."

At the conclusion of the paper, which was humerous in some of the descriptions,

The CHAIRMAN said that he should have expected that with a foreground so dark natural clouds would have been impossible even with the wet process, and therefore not to be expected on a Fothergill plate.

Mr. SEELEY said that clouds could only be well rendered when the camera was looking nearly at the sun, and the pictures before them were evidently not lit in that manner.

Mr. SHADBOLT remarked that good photographers found no difficulty in getting both clouds and foreground.

After a conversation on nitrate of lead in the iron developer, the meeting terminated.

THE AMERICAN PHOTOGRAPHICAL SOCIETY.

FIFTY-SECOND MEETING.*

THE regular monthly meeting of the society was held on Monday evening, December 14th, in the University Chapel; Colonel N. PIKE in the chair; Mr. O. G. MASON, secretary, *pro tem.*

The minutes of the last meeting were read and approved.

Views at Night.—Professor SEELY presented two very fine pictures donated by Mr. Whipple, of Boston—views taken of the Fountain, in Boston Common, at night, while illuminated by the electric light. They were pronounced to be very fine; and the chairman remarked that they were all aware of the great difficulty of taking pictures by night. In these, the spray of the fountain was well shown, and even the leaves of the trees, and persons standing under the trees.

The following letter accompanied the photographs:—

"Mr. John A. Whipple, of this city, presents to the New York Photographical Society the enclosed views of a fountain, taken when illuminated by the electric light. The following memoranda are given by Mr. Whipple:—

"'Taken by electric light on the evening of August 6th, 1863, about 10 o'clock, P.M, with a 5-inch, 16-inch focus, Voigtlander patent combination, with an exposure of about 90 seconds, with full aperture. The image came up immediately, strong, without redeveloping. A very curious effect is given to the trees; those leaves only are photographed which were in position to reflect the light directly into the instrument, their number is few, and the trees appear to be nearly bare of foliage. The effect of the electric light, as compared with sunlight, is about in the proportion of 1 to 180—90 seconds exposure being required in the former case, while in sunlight, or slightly hazy daylight, about one half second is sufficient to produce the same effect.'"

Some very beautiful vignettes, taken by Merz and Ulrich, and Mr. Ormsbee, were exhibited; and two out-door views taken by Mr. Rockwood, with the Fitz lens, in which the foreground was remarkably fine and distinct.

On motion, the thanks of the society were voted to Mr. John A. Whipple, of Boston.

The Wax Paper Process.—Professor SEELY said that they had all experienced such difficulty in the wax paper process, that he wished to take advantage of the presence of Messrs. Prevost and Newton—two gentlemen who had been most successful in the use of that process, the pictures exhibited by them at a previous meeting having been greatly admired—to request them to give the members some information on this subject.

Mr. PREVOST responded by giving a very interesting and detailed account of his manner of working with the wax process.

Professor SEELY thought that the account they had heard from Mr. Prevost would be sufficient to create interest in the subject. The fact might prove a further stimulus, that Mr. Newton succeeded in his first attempt with the wax paper, without any further instruction than what he had received by reading a treatise in his office. In the wax paper process there was less labour than with the collodion, the preparation for the latter being tedious. Seriously, there are only two objections to the wax paper process—the slowness of production, and the incidental imperfections in the paper. The former objection was not so great in taking stationary objects, where a longer

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* From the *American Journal.*

period of time could, in many cases, be as readily given; and the imperfections of the paper seem to have been obviated by Mr. Prevost. They were always certain, with the wax paper process, to get a negative of the proper intensity, and with proper care and attention could secure evenness of development and of impression all over the surface, which was so easy with collodion. Large negatives were easily prepared.

Colonel PIKE considered the wax paper process of great advantage to photographers when travelling, the paper being easily packed, and not subject to breakage, like glass.

Professor SEELY said, that the wax paper, before being silvered, would keep for ever; and when silvered, would keep as long as the tannin plates.

Lenses.—The subject of lenses, continued from the previous meeting, came up for discussion.

Mr. TILLMAN did not think they were any better prepared to discuss the subject now than at the former meeting. He noticed that the secretary had some pictures taken by the Fitz lens; but in his opinion a comparison of pictures decided nothing, for good pictures were often taken with a poor instrument, and *vice versâ;* so much depended upon the manipulation.

A desultory conversation ensued in regard to the merits of the different lenses—there being apparently a restraint on the part of members in expressing their opinion, lest offence should be given to the friends of the Harrison or Fitz lens.

Professor SEELY regretted to see this, and hoped that while, personally, they had the highest regard for both parties, as a society they would consider only what was due to science and American art. If he could find an American to produce something superior to either the Globe or Fitz lens, he would take pleasure in putting it forward. Perhaps, as matters stood, it would be unpleasant for a committee to make experiments itself, and so decide; but he suggested that those who were interested in the respective lenses make experiments, and supply the committee with material on which to decide, and give a scientific report. He would cheerfully volunteer to draw up a scientific paper for either lens, if the manufacturer furnished him with data.

The society here adjourned.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, January 27th, 1864.

THE photographic millenium is nearer than I expected. M. Disderi has startled the heliographic world with the following communication, addressed to *Les Mondes*, and other scientific journals. As it is so important and unique, I shall give it entire. He says, "I think it will be gratifying to your readers if you will publish the following lines:—In 1839, two men of genius, Nicephore Niepce and Daguerre, endowed France with one of the most beautiful discoveries of modern times, the object of which was the fixing upon a silvered plate the pictures produced by the luminous rays in the camera. The operation had, however, to be repeated every time a new proof was required.

"Some years later, Mr. Talbot substituted paper for the metallic plate, and by various chemical processes, obtained, instead of the single Daguerrean picture, a *negative* proof, from which an infinite number of other proofs, *positives*, could be obtained, thus *multiplicity was attained.*

"The improvements made almost daily in this new art admit of our now obtaining permanent pictures; nevertheless, it too frequently happens that many pictures obtained and fixed under identical conditions, do not exhibit the same conditions of durability, hence it happens that some of them, after a varying lapse of time, either become spotted, stained, or, fading, lose their primitive vigour.

"In order to avoid this inconvenience, every intelligent photographer has, for many years past, sought for the means of rendering photographic pictures really permanent, and some photographic illustrations have, by various processes, attained to results that are almost perfect.

"It is one among these results that I submit to the public; in a word, *photographic engraving* is discovered.

"By Messrs. Girard and Co.'s processes we can, by means of this new discovery, *obtain a picture from a glass negative engraved on copper, in twenty-four hours*, which permits of many hundred copies being printed in a few hours.

"This immense progress is the climax of photography: it opens a new era to it, permitting its co-operation in the illustration of all our arts and manufactures, not only by its scrupulous fidelity of representation, but also by its incredible rapidity.

"The following examples may be taken among a thousand others:—Take for instance, an engraving by one of our best artists, measuring, say, 10, 15, or 20 inches square, which has cost the engraver two, five, or perhaps even ten years of assiduous labour to produce the plate. In four and twenty hours, Girard and Co. can, if required, produce a *fac-simile* plate, or a reduced one, that shall yield unexceptionable proofs. Again, take a collection of bronzes, sculptures, goldsmiths' work, jewellery, shawls, laces, embroideries, cameos, medals, and any similar work of art.

"Think how much time it would take for the hand of man to produce, on a steel plate, a representation of all those marvels of art, and, especially, how much talent it requires to produce them faithfully.

"In four and twenty hours a copper or steel plate may be 'drawn and engraved' with a delicacy and accuracy truly marvellous.

"Hitherto, in consequence of various impediments, photography has not been much employed to illustrate printed books. This difficulty is now overcome by *photographic engraving;* the plates required to illustrate the text of a book may be obtained in a few days, without destroying the artist's original drawing.

"Finally, photographic engraving is applicable to every subject—to works of art and to manufactures; it can reduce the maps and plans necessary for the army, copy and multiply the treasures of our museums, our picture galleries, laboratories, factories, workshops, arsenals, navy yards, &c. &c.; or copy a picture by one of our first painters, and in a few days diffuse an engraving of it throughout the world.

"I have been so fortunate as to receive from the proprietors of this process an offer of a share in it; they applied to me because they knew I would not shrink from any difficulty when photographic progress is in question. A special agreement constitutes me a partner in the working of the process. It is in this capacity that I have felt it my duty to communicate to you the complete realization of this immense work, sought for and waited for during many long years."—*Disderi.*

The names connected with this announcement are sufficient guarantee of its integrity, which, in fact, is confirmed by the Abbé Moigno in *Les Mondes*, who has seen specimens of plates produced by MM. Girard and Co.'s process, and pronounces them irreproachable. Thus, singularly enough, the art of photographic engraving, casting out branches in various directions, has suddenly culminated in a blossom which may be compared with that of the *Victoria Regia*. Truly, we may now proclaim a "great revolution in the art of engraving," as great an era in art as that of Marc Antonio Raimondi's *début*. It will be remembered that about a year ago a similar discovery was announced in the United States; but like "photography in natural colours," and many other wonderful discoveries proclaimed in that hemisphere, it was followed by no "proofs;" hence, we may conclude, that the discovery was hoped for, but not seen. M. Eugene Sahler, who has at various times essayed to establish a satisfactory theory of the formation of the photographic image, has just communicated to the editor of the *Revue Photographique* some further experiments he has made, which go to show that the action of light on the inside of silver causes a chemical combination or an oxydation of the iodide, forming oxyiodide of silver.

The results obtained in the dry process confirm this

opinion, as the tannin, resins, &c., bodies which slowly absorb oxygen, facilitate the oxydation of the sensitive film.

In *La Lumière*, M. Gaudin publishes some very interesting remarks and suggestions on the nitrate bath, showing the utility of boiling it, when iodized. I must refer you to the paper itself for details.

Many of the processes for printing positives, with other ingredients beside the salts of silver, are in vogue; but the secret remains in the hands of those employing them. One, however, by Herr Obernetter, of Munich, is published, and seems worthy of notice, in which the salts of iron and copper are under the influence of particular reagents, substituted for the salts of silver. The process, and its adjuncts, exhibit remarkable ingenuity.

We have not heard the last word on dry collodion yet: the Abbé Desprats has just put in a claim by way of a review of what he suggested some years ago on this head; and now M. Piard, an amateur at Landrecies, announces his dry process, in which caustic potassa and iodide of arsenic perform a conspicuous part. The exposure required for dry plates prepared by this formula is *one second* to obtain a transparent positive by the light of a petroleum lamp.

MM. Davanne and Girard have at length concluded their valuable researches into "the philosophy of positive printing," in which so many doubtful points are cleared up that he must be a wanton, wilful blunderer, who goes astray and gets into a "mess."

Photographic Notes and Queries.

NITRATE OF SODA.

SIR,—On reading in your last number of the experiences of Mr. H. Cooper, junr., with nitrate of soda, I feel again inclined to address you on the subject.

The sample which Mr. Cooper describes as of a pale brown tint, cannot have been pure—nitrate of soda being perfectly white. If it be contaminated with a chloride, the colour will be the same, because chloride of soda is also white, as everybody knows. Impurity of this kind would only precipitate some of the silver in the bath, thus the chloride would at once be converted into nitrate of soda.

I consider your remark, that it is the impure nitrate of soda which caused the annoyances of those experimenters who were unsuccessful with the article, perfectly true, and it seems a pity that not even a chemical which is so easily made as nitrate of soda should be supplied to photographers in good quality. It causes waste of time and materials, and prevents a fair trial of the merits of an article.—I remain, dear sir, yours respectfully,

AUGUST BUSCH.

14, *Clifton Crescent, Asylum Road, London, S. E.*
January 26, 1864.

Talk in the Studio.

PHOTOGRAPHS IN INDIA.—The *Allahabad Gazette* states that a photographer is to be attached to the Thomason College at Roorkee, chiefly for the purpose of instructing the natives in the art, to enable them to show the progress of public works.

PHOTOGRAPHIC IMAGE ON A DEAD EYE.—Some time ago one of your correspondents communicated, in perfect good faith, particulars of an experiment by which he was led to the conviction that an image of the pavement of the slaughter-house was impressed on the eye of a dead calf, and suggested an examination of the eye of a murdered person might afford a clue to the detection of the murderer. Our own conviction is now as it was from the first, that the idea was based on an error of observation. That such an impression could exist is, we take it, an impossibility, involving the supposition that the retina can retain images formed upon it after the objects forming them are removed, to disprove which a person only has to shut his eyes. It is very odd, however, that the conjecture of an English photographer is at once followed in all quarters of the world by alleged facts to confirm it. In France and America such cases have since been recorded. The last is from Russia. The *Times* relates it as a large *canard* from the North. A tale of a murder, perpetrated in a mysterious manner, and of the discovery of the murderers by scientific means, is now the common talk of the inhabitants of the Russian capital. In the so-called old city, on the right shore of the Neva, behind the fortress, is a small house, which enjoys the reputation of having once been the residence of Peter the Great. One of the few rooms in the house is stated to have been used as a sleeping chamber by the celebrated monarch, and this apartment is now visited with feelings of veneration and awe by many thousands of Russians. Although the room is not in reality a chapel, a priest is attached to it, and it is richly adorned with gold and precious stones, on which account two soldiers are constantly on duty there. A few evenings since, after the priest had withdrawn to his dwelling, situated on the opposite side of the street, he was summoned to return to the chapel, as two men required his services. The good man soon repaired to the little chamber, and afterwards returned to his house. On the following morning the two soldiers on guard were found murdered at their posts, and the alms-box, which contained 400 roubles, had disappeared from its accustomed place, while the costly articles with which the room was so plentifully adorned were found undisturbed. It was suggested that the eyes of the murdered soldiers should be immediately photographed, in the hope of successfully testing the discovery recently made in England, when, to the surprise of all, the result was the production of the portraits of two soldiers of the private guard at the palace, on whose breasts were the insignia of the Cross of St. George. The murderers were at once sought out and apprehended."

PHOTOGRAPHY AND PAINTING.—The *Times* in recently criticizing a portrait of Thackeray, photographed from a crayon drawing by Lawrence, makes a few remarks which with some qualifications a photographer may agree with, without injustice to his own art. It says:—"It requires no small merit in a drawing, or photograph from one, to hold its own against the direct work of the sun. Whatever may be the demerits of Phœbus Apollo as a painter, he has qualities which make him a tremendously formidable rival to the limner, who has to trust the unaided powers of pencil or port-crayon. But it only needs a comparison of Mr. Lawrence's photographed drawing with any of the heads photographed from Thackeray himself to feel that good work of the human brain and hand—even when it is but the transcript of a living physiognomy—has in it something which cannot be got out of the soulless operation of chemicals and camera. No one who knew and loved Thackeray could hesitate a moment between the facsimile of Lawrence's drawing and the finest photograph ever taken from the noble head of the living Thackeray." The reviewer then further adds:—"For such a likeness we have every reason to be grateful to Mr. Lawrence, and to the photographer's art, which multiplies copies of such a drawing so cheaply."

THE GODDARD FUND.—We are glad to perceive that the appeal on behalf of the discoverer of the photographic use of bromine has been transferred from our columns into some of the American journals. The *Scientific American*, one of the most interesting and influential scientific journals in the States, after reproducing the appeal, adds: "We copy the above from the PHOTOGRAPHIC NEWS (London). We most cordially second the appeal there presented in behalf of Mr. Goddard. The importance of his discoveries cannot be over-estimated. We hope that the photographers of this country will not be backward in raising a substantial token of their appreciation and respect. Who will have the honour of moving first in this matter?" We shall be glad to see our American brethren, who have been especially distinguished by their appreciation of bromine, take action in the matter. They will be glad to see that photographers in this country are steadily progressing in liberal response to the appeal. We here take occasion to thank our readers for the honourable position they have borne in the subscription list. We hope that those who have not yet contributed, and feel that they owe anything to photography, either for profit or pleasure derived from it, will shortly do so, and thus place the declining years of a worthy man and public benefactor beyond the chance of want.

"THE SILVER SUNBEAM."—This is the title of one of the best theoretical and practical works on photography which has yet been issued. It is written by Dr. Towler, the able Editor of *Humphrey's Journal*, and published in this country by Mr. Atkinson, of Liverpool. We shall notice more fully at an early date.

To Correspondents.

MUTATIS MUTANDIS—The causes of the red deposit, during intensifying, are very various. It sometimes proceeds from the conditiou of the bath, organic matter being present. It sometimes proceeds from the collodion; sometimes from the use of silver solution taken from the bath, to add to the pyrogallic solution, instead of using a fresh solution kept for the purpose; sometimes from light entering the dark room, &c. The use of citric acid, instead of acetic acid, in the pyro solution, will tend to prevent it. The application of a solution of iodine before intensifying, is an almost invariable preventive. You will find the subject fully treated in our YEAR-BOOK, just issued. 2. The best toning bath is largely a matter of taste: much depends on the result to be produced. The acctate bath is the best for warm or purple tones; some of the lime baths for black tones. You will find the various formulæ given in our YEAR-BOOK, just referred to. A very good lime bath is made by adding 2 grains of chloride of gold, and 3 grains of chloride of lime, to 10 ounces of water, and keeping it a few days before use. 3. Any newsvendor or bookseller can supply you with the PHOTOGRAPHIC NEWS or YEAR-BOOK, but if you have any difficulty in obtaining them, our publisher will supply them direct.

J. G. M.—If you have space enough to work it, the No. 1 B *long* will give better definition all over the plate than the No. 1 B. It will require about 2 feet more, we believe, between the camera and sitter.

ONE WHO HAS LEARNED ALL HE KNOWS OF PHOTOGRAPHY FROM THE NEWS AND ITS ALMANACS.—There is no objection to postponing the intensifying until you can do it at leisure; many skilful amateurs and professional photographers do so. Some, indeed, postpone the fixing, also, in order to economise time and water. Cyanide is removed with less washing than is necessary for hypo. 3. After developing with iron, and washing, you may bring the negative into the light to fix. 4. It is quite permissible to coat the plate with collodion, with the box lid open, merely taking care to shelter it from the wind, &c. If the bath be covered the moment the plate is immersed, there will be no danger of fog. In fact, all the points you have considered doubtful have been satisfactorily tested, in general practice, and found quite permissible.

J. R.—The case you describe is a very difficult one to deal with. It is probable that a wet plate will best answer the purpose. If the side wind we will admit sufficient light you may then cover up the end window during the greater part of the exposure, merely uncovering it for a short time at the end. It is difficult to advise, in regard to special cases, merely from description: such cases often require special contrivances, only suggested by a personal examination of the circumstances.

R. P. SOUTHALL.—So far as we know, the backgrounds of the maker to whom you refer are very good. It is difficult to describe the proper colour desirable better than to call it a grey of medium tint.

AN AMATEUR.—We should prefer No. 2 in your list. 2. The term "orthographic" is applied to a lens proposed by Professor Petzval for the purpose of superseding the view lens. It consists of two achromatic combinations: the front lens is similar to the ordinary view lens: the back lens is much smaller and consists of a double concave of crown glass and a meniscus of flint with its concave side facing the double concave, the edges in contact. The back lens assists in flattening the field. The distortion given by this lens is of the opposite kind to that given by the single view lens, straight lines being curved with the ends outwards, giving what is termed the pincushion shape. We believe all the papers you mention are good, we should perhaps prefer 2 and 3.

HENRY SAVEAS.—If you send us a specimen of the kind of stain, we can judge better of the cause. Possibly neutralizing and sunning the bath will remove the tendency. The pinholes are probably caused by supersaturation with iodide. See the YEAR-BOOK for mode of removing it.

WARLOCK.—You may produce very good card pictures with the No. 1 triple, but, of course, it will not be quite so rapid as a portrait lens. It will work on a quarter-plate camera, unless the body be very short, and do not extend a sufficient length to suit the focus of the lens.

J. LUGG.—The object of a little acid is to prevent the precipitation of the lead; just sufficient to make the water redden litmus paper will suffice. When the acid is added, common water may be used. It is better to tone the print before fixing, for various reasons. In the first place, it is much more easily effected before fixing; and, in the next place, if a print be fixed, and then toned, it is possible that a portion of chloride of silver may be again formed, which, by exposure to light, would become darkened. Chloride of lime, sent through the post in paper, would probably be much deteriorated by losing chlorine. You can obtain it at any chemist's, or even chandler's shop, by asking for "bleaching powder."

A NEW SUBSCRIBER.—Mr. Rouch's collodion can be obtained at his own establishment, 180, Strand; you will, doubtless, find particulars in our advertising columns. 2. The plate which is immersed a few hours in the bath, is for the purpose of saturating the bath with iodide. Plates for use should not remain more than three minutes in the bath. 3. The bath for negatives should be worked as nearly neutral as possible; if nitric acid be necessary to make it work clean, one or two drops to a pint of bath will generally be sufficient. 4. From ten to twenty drops in half an ounce or an ounce of pyro solution. A 10-grain solution, means a solution with 10 grains to a fluid ounce of water. You will find some valuable hints in our YEAR-BOOK just issued. We have posted your letter.

OAKELL.—You operate with care, and your pictures possess some good qualities. The chief defect arises from the lighting; the light is too directly a top front light, which flattens the face and destroys modelling. No. 1 is a pleasing *pose*, and is in many respects a good picture, but there is a slight tendency to chalkiness in the face; in fact, all the pictures have that tendency.

J. H. S.—It will be better to make C to D opaque for five feet. 2. Ten feet of glass will do in the top; but there can be no objection to having two feet more, as it is always possible to shut out light by blinds, when it is not needed. 3. No serious disadvantage will arise from the projection of the roof at F. 4. It would be better to have A B glazed. Your general arrangements, so far as we can judge, will be successful. Before proceeding to your alterations, however, read first article in the present number.

H. BAYLEY.—As a general rule, we cannot recommend second-hand back grounds.

MENISCUS.—Messrs. Hopkin and Williams's address is New Cavendish Street, W.

J. L. BAERETON—The draft for £2 received and placed to your credit. It prepays the NEWS up to No. 399. The ALMANAC has been duly forwarded. The smallest sized triple lens made is for plates 6×5 in. The price is £4 4s.; and the next for whole plates £5 10s. We are obliged by your good opinion, and shall have much pleasure in receiving communications from you.

CAMERA.—Other things being equal, greater depth of focus is obtained by the use of a lens of long focus. If you use a lens of, say, 8 in. focus to obtain a card portrait, you will have more depth of focus than if you use one of 6 in. focus. The statement that depth of focus is obtained by a lens of short focus, is true in another sense, thus: If you place a lens of 6 in. focus, and one of 8 in. focus, with relatively equal foci, side by side, to give an image of some object say 60 feet distant, the image rendered by the short lens focus will be much smaller, but there will be more depth of focus in the picture than in that by the lens of long focus. But if you remove the lens of long focus further back, so that the images given by each are of the same size, then the long focus will give the greatest depth of definition. We cannot speak with certainty of the lens to which you refer, as we have not tried it. We do not clearly understand what you mean by a lens for long distances. Do you mean a lens to take very distant objects? If so, you should have a lens of moderately long focus, as one of short focus will give the objects very small. What size of stop have you used? Try placing it in front of the lens, instead of between the front and back lens.

H. R. R.—A triple lens will relieve you of the annoying curved lines in architecture. You are right in your conjecture that the No 3 triple will cover a 12 by 10 plate; we have seen very fine pictures of that size produced by it. Many of Col. Stuart Wortley's pictures on that sized plate were produced by the No. 2 triple, but instantaneous sea views do not require the same perfect covering up to the edges which architectural subjects require. We have not tried the stereo lens you name; it will probably be more rapid than the one you possess; but it is of too short a focus to do justice to card portraits unless it be used with a very small stop indeed. We are obliged by the very friendly expression of your good opinion, and shall have pleasure in seeing some of your specimens.

STONEY.—In using chalk or whiting to neutralize free acid in chloride of gold there is no danger of using excess, as it is insoluble in water. You may keep it ready mixed more than the three hours beforehand mentioned, but with this danger, that when quite neutral the gold in solution is very ready to become reduced by light, or any slight disturbing agency. If "Stoney" had read the various articles on the subject which have appeared in our pages, he would be familiar with the value of heat in aiding the maturity of a toning bath. The matter is very simple: add excess of carbonate of lime, which "Stoney" does not seem to know is whiting, and aid its action by the addition of hot water. As Mr. Blanchard directs, the bath is to be made fresh every day. There are various baths which may be kept almost indefinitely, for which see our YEAR-BOOK.

T. R. LANE.—We are obliged by the stereographs, which are very interesting.

JAMES THORNLEY.—We do not know the advertiser to whom you refer; but will endeavour to make inquiry.

M. P. S.—We believe at the next meeting. 2. The publisher can furnish all the numbers required, with the exception of four. Nos. 6 and 9 will be taken in exchange; copies of the others are not required.

Several correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already received	181	3	8
Messrs. Levi and Co.	1	1	0
J. Soloman, Esq. (2nd donation)	0	5	0
C. E. Elliot, Esq., Aldermaubury	2	2	0
James Kendall, Esq.	1	1	0
W. H. O.	0	5	0
T. B.	0	5	0
J. W. Pickering, Esq.	0	7	6
E. Cutler, Esq.	0	10	0
G. Ault, Esq.	0	10	6
T. T., Bristol	0	10	6
Ely	0	1	6
M. D.	0	5	0
J. Stringfellow, Esq.	0	5	0
William Mayland, Esq., Cambridge	5	5	0
William S. Parry, Esq., Newcastle-on-Tyne	1	1	0
Walter Woodbury, Esq., Manchester	1	1	0
Thomas Heaviside, Esq., Durham	1	1	0
F. Cooke, Esq., Tunbridge	0	10	6
W. Farren, Esq., Cambridge	0	5	0
Willing Helper	0	10	0
T B.	0	5	0
James Laing, Esq., Shrewsbury	0	10	6
	£199	1	8

ERRATUM.

Henry Vicey, Esq., last week, should have been Henry Vines, Esq., Bristol.

Photographs Registered during the Past Week.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of the Duke of Cleveland.
Photograph of J. E. Headlam, Esq., M.P.

MESSRS. PETTITT BROTHERS, 30, Paradise Street, Birmingham,
Photograph of George Frederick Muntz, Esq.
Photograph of Rev. Charles Bndham, D.D.

MR. PAUL HAGELSTEIN, Brussels,
Photograph of Christian IX., King of Denmark.

All communications for the Editor to be addressed to 32, PATERNOSTER ROW.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 283.—*February* 5, 1864.

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CHLORIDE OF GOLD AND AURO-CHLORIDE OF SODIUM.

A SIMPLE TEST FOR PURITY.

THE photographer does not need to be told that whether he purchase chloride of gold, auro-chloride of sodium, or any other preparation of gold, it is to the amount of the precious metal it contains its sole value as a toning agent is due. It unfortunately happens that whilst the costly nature of the principal element offers a strong temptation to adulteration, the character of the salts affords very easy facilities for such adulteration being practised without ready detection. The frauds in this direction have frequently been detected by careful analysis of commercial samples of these salts, and the results duly published. About three years ago, Mr. R. Reynolds made such an examination, from the result of which, recorded in our columns, it appeared that some fifteen-grain bottles did not contain more than half their legitimate quantity of gold, the rest being chloride of sodium, moisture, and free acid. More recently, the same gentleman called the attention of the British Pharmaceutical Conference, at Newcastle-on-Tyne, to the prevalence of this fraud, and stated, as the result of a recent analysis of a fifteen-grain bottle, a deficit of about one-fourth of the quantity of gold. A writer in a contemporary makes a still more startling statement, and gives 2·22 grains of gold as the contents of one fifteen-grain tube of gold examined, showing a deficit of more than two-thirds of the legitimate amount.

Unfortunately, these statements cut two ways, and implicate honest manufacturers as much as they do rogues. Both Mr. Reynolds and the writer last referred to find that samples from some manufacturers contain their due proportion of gold. But as neither the names of fraudulent dealers nor honest tradesmen can in such cases be conveniently given, they share a common stigma, and the photographer is left to two resources: he may either take his chance of paying half a crown for less than sixpennyworth of gold; or, he may make his own chloride of gold, either alternative being, we fear, very distasteful to a very large class of photographers. The latter method is recommended by the last writer referred to, and a somewhat singular and unfair calculation is given to prove that photographers will always be gainers by making their own chloride of gold. If they are familiar with chemical manipulations, and have facilities for the operation, they will doubtless save something, as they will by making for themselves any other article, the purchase of which involves the payment of the manufacturers' and retailers' profit, as well as the intrinsic cost of production. The preparation of chloride of gold is not a difficult operation, especially after a little experience has been gained. But it involves some risks, which those whose time and attention are fully otherwise engaged, or those, such as amateurs and others, whose consumption is small, will decline. For such of our readers as are inclined to undertake the experiment we shall probably repeat some detailed instructions shortly; but we are anxious now to give some hints to aid those who, for various reasons, must purchase their chloride of gold ready prepared, to ascertain for themselves that they obtain a legitimate commercial return for their money.

The analysis of chloride of gold is a very delicate operation, which can only be successfully undertaken by the practised chemist; and it moreover always involves the reduction of the gold, which must be reconverted into chloride before it can be useful to the photographer. Analysis is therefore out of the question. The practised eye will often detect if any large amount of adulteration is present by the appearance of the salt, which, when pure, is of a deep orange colour, and very deliquescent. The usual adulteration is chloride of sodium, common salt, which gives the mass a paler colour, and preserves it from deliquescence. There are various commercial samples sold, as "The double chloride of gold and sodium," "sodio-chloride of gold," "auro-chloride of sodium," and "neutral non-deliquescent chloride of gold." These different names generally indicate one thing, which, if pure, is a double salt of gold and sodium in fine well defined crystals of a bright light orange colour. Fifteen grains of this salt, if pure, contain a fraction over 7 grains of gold, whilst 15 grains of crystallized chloride of gold, if pure, contain a fraction over 8 grains of gold. But the double salt of gold and sodium is often adulterated with a large excess of chloride of sodium. When this is the case, it is never in crystals, it is always granular, dry, and light in colour, just in proportion to the amount of adulteration. Let our non-chemical readers remember that if the excess chloride of sodium be added during the manufacture, before the gold is crystallized, or if carbonate of soda be added to neutralize the excess of hydrochloric acid, the double salt of gold and sodium would crystallize simple in the due atomic proportion of the two metals, and any crystals of chloride of sodium, if present, would be at once distinguishable by their form and whiteness. But when the adulteration is practised in the manufacture, the solution is well stirred during the time of crystallization, so that the whole shall form a granular or amorphous mass. Sometimes the excess of chloride of sodium is added to the pure salt, and the whole pounded together in a mortar to secure intimate mixing. In all cases, the result is the same, the adulterated salt is dry and granular, and generally light in colour. We may here remark that whilst the adulteration is generally effected by the manufacturer, the dishonesty of such adulteration does not necessarily attach to him, or at least, not to him exclusively. Many manufacturers are specifically called upon by their customers to carry out the peccant practice. Some dealers induced by greed of gain, or by the desire to secure a factitious appearance of *cheapness*—that bane of photography—order the chloride at a given low price, less than the bare cost of manufacture in the pure salt. Some manufacturers, to meet such cases, prepare three qualities, and sell them at three different prices. It is to be re-

gretted that any manufacturer will descend to such a practice. It is to be hoped that it is not common. Unfortunately, one tainted sheep will discredit a whole flock; one infected person place a whole ship's company in quarantine; and one unscrupulous manufacturer bring suspicion upon the whole trade.

Mode of Testing.—The test we propose is very simple, can be practised by every photographer, and instead of reducing his chloride of gold, or rendering it useless, it simply places it in the best condition for use. It is based on this fact:—Chloride of gold is soluble in alcohol, and chloride of sodium is not. If a sample of chloride of gold be pure, it will rapidly and completely dissolve in a very small quantity of alcohol. If any free chloride of sodium be present, it will be left undissolved at the bottom. The pure double chloride of gold and sodium is also soluble in alcohol,* and any free chloride of sodium mixed with it would also be left undissolved at the bottom. Ether may be used instead of alcohol, but being more volatile, it is more troublesome to use.

Proceed as follows:—Take the doubtful tube of gold—and all the pale granular samples are doubtful—and dissolve its contents in an ounce of absolute alcohol. If they dissolve completely, it is either pure chloride of gold or the pure double salt. If a white residue be left, it is (at least in ninety-nine cases of a hundred†), chloride of sodium, which is, of course, useless. If it be desired to ascertain the exact amount of adulteration, first weigh, very carefully, the tube and its contents. Then, after dissolving the chloride of gold, and filtering it off, carefully collect and dry the filtrate. This, together with the empty tube, is now again carefully weighed, and the difference between this and the former weight gives the amount of pure chloride of gold the tube contained.

If the alcohol contained any water, a little of the chloride of sodium would be dissolved, and the test as to quantity to such extent vitiated. This test will not distinguish between chloride of gold and the sodio-chloride of gold; but the difference in the amount of gold between the two, when each is pure, is not great, as the latter can be crystallized without any free acid, which is not the case with the simple chloride, and the tendency is with the latter, even when free from adulteration, to have excess of moisture and free acid to an extent which reduces the proportion of gold quite to the level of the sodio-chloride. The practised eye will, moreover, distinguish readily between the well defined dry crystals of the double salt and the redder and more deliquescent appearance of the simple chloride.

This method of testing is well worth the attention of photographers, both in justice to themselves and to respectable manufacturers who otherwise rest under the general stigma. That there are perfectly honest manufacturers is demonstrated by the fact that in all the recorded instances of examination some of the samples have contained their full proportion of gold. A sample procured from the regular stock of a large house in Hatton Garden, for verification of some of the points to which we have referred, labelled as non-deliquescent chloride of gold, guaranteed to contain seven grains of gold, was found to be the pure double salt, free from adulteration.

We will conclude with one word on the alcoholic solution of chloride of gold. It is in every way preferable for stock purposes to an aqueous solution. The latter, as photographers know, if neutral, or nearly so, is apt to deposit gold, especially if kept in the light. The salt is so ready to part with its chlorine to the water that it is very easily decomposed. In alcohol this danger does not exist. The alcoholic solution may be kept quite neutral, ready for making up into a toning bath without danger of reduction, and an important advantage in toning operations secured.

* We call the attention of Mr. Price to this fact, in support of the idea that this is a true double salt. If the two chlorides were only held together in some mechanical manner, the alcohol would separate them, dissolving the gold salt, and leaving the sodium undissolved; but whilst chloride of sodium is insoluble in ether or alcohol, the double salt is as soluble as chloride of gold alone, showing chemical combination.

† There are only two or three of the chlorides, such as those of cadmium or strontian, soluble to any extent in alcohol, and these are not used in adulterating chloride of gold. It is possible the chlorides of potassium or ammonium may occasionally be used, but they, as well as chloride of sodium, would remain undissolved.

PHOTOGRAPHIC EXHIBITION.

It is now definitely decided that the forthcoming exhibition of the Photographic Society, will be held in the Gallery of the Female Artists, in Pall Mall. It will open in the second week in May, and close in August; thus continuing open for three months.

This arrangement will, we apprehend, give great satisfaction to photographers for several reasons. In the first place, the exhibition will be open during the London season, when everybody is in town, and will, in consequence, afford facility for a much larger attendance of visitors, especially of that class chiefly interested in art progress, than an exhibition held in winter. In the next place, it will be held in a suitable room in a good position. The gallery in Suffolk Street, although large, is dingy, dreary, ill-lighted, and a little out of the way. It is, in scarcely any sense, suitable for a photographic exhibition, and we believe every such exhibition held in it has involved a loss. The gallery now secured, although smaller, is, we believe, better and more convenient in every sense. And, lastly, photographers can avail themselves of the valuable spring photographic weather, which may be anticipated before the opening, to secure worthy pictures for exhibition. Details as to medals, and other conditions not yet finally decided, will be duly announced. We hope that with the improved circumstances, the approaching exhibition will be the most successful yet held.

THE POETS AND PHOTOGRAPHY.

BY H. P. ROBINSON.

The homely proverb, "All work and no play makes Jack a dull boy," reminds us that a little light reading might sometimes advantageously take the place of formulæ and processes. A friend suggests that all photographic literature *is* light reading, but he must be joking. "There is no wisdom but hath a smack of folly," and there is no reason why the stern rule which excludes all but the "serious and great business" of their purpose should not be occasionally relaxed by journals devoted to science. Acting on this idea, I have strung together, for the Photographic News, a few passages from the poets, in which it scarcely requires a lively imagination to trace allusions to our art. The extreme appositeness of some of them is almost as wonderful as photography itself. The first that I lay under contribution shall be the works of the great poet whose Tercentenary we are all so anxious to celebrate with becoming splendour. In Shakespere it is possible to find allusions to almost any subject that can be imagined,* it is therefore not surprising that many have been discovered which will suit our present purpose; what can be better to start with than—

"Drawn by the powerful sun."—King Lear.

Or this—

"The glorious sun
Stays in its course and plays the alchymist."—King John.

The following is, perhaps, not so good, but it is sufficiently near to obtain a place in this collection—

"Shine out, fair sun, till I have bought a glass,
That I may see my shadow as I pass."—Richard III.

* Theodore Hook used to boast that he could find a quotation in Shakespere apposite to any subject in the heavens above, the earth beneath, or the waters under the earth. One of his friends resolved to puzzle him, and told him so. Hook asked how long a time his friend would assign him to solve the puzzle. "Ten minutes," was the reply. "Well, the subject?" said Hook. "The treadmill," replied his friend, that instrument for securing "all action and no go," having just been invented. "Oh!" said Hook, "it does not require ten seconds, 'Down, thou climbing sorrow,'" quoting from "Lear," act ii., sc. iv.

Here is a curious bit of subtlety from "The Winter's Tale," which does not call for much ingenuity to apply to the photographic art.

Perdita. "For I have heard It said,
There is an art, which, in their piedness, shares
With great creating nature.

Polixenes. Say there be;
Yet nature is made better by no mean,
But nature makes that mean: so o'er that art,
Which you say adds to nature, is an art
That nature makes. * * * * *
* * * * This is an art
Which does mend nature,—change it rather; but
The art itself is nature."

The photographer who is fond of far-fetched reference will readily quote Shakespere when he says—

"O,'tis the sun which maketh all things."—Love's Labour Lost.

Or will discover an occult allusion to photographic operations in the same great poet's phrase—

"Light seeking light, doth light of light beguile."—Love's Labour Lost.

He will discover an unquestionable allusion to the operation of developing in the sentence from the same speech—

"You find where light in darkness lies,
Your light(s) grow dark."

And will readily admit his works to be, like the Egyptian serpent, bred—

"By the operation of the sun."—Antony and Cleopatra.

And he will further admit that they all wear—

"The shadowed livery of the burnished sun."—Merchant of Venice.

And when he is taunted with the imperfections or want of permanency in these works, and told, still in the words of the same master mind, that they "come like shadows, so depart," he will gladly and gratefully again quote the words of "Sweet Will"—

"The best in this kind are but shadows: and the worst are no worse if imagination amend them."—Midsummer Night's Dream.

Or giving a voice to the pictures themselves, will add from the same play.

"If we shadows have offended,
Think but this and all is mended.
* * * * * *
Gentles do not reprehend,
If you pardon, we will mend."

Cowper must have seen a photographic printer at work when he wrote

"Again, so oft
As the sun peeps, and vernal airs breathe mild,
The fence withdrawn, he gives them every beam,
And spreads his hopes before the blaze of day."
The Task.

Here is another from the same:—

"His frame may front
The sun's meridian disk."

Having thus watched the photographic printer engaged in his daily duties, we may suppose him to produce his well-known lines

"Blest be the art that can immortalise."

Of all writers, Dr. Watts would probably be the last to refer to for an addition to our selections, yet the last line of the following verse comes pat:—

"Sounds which address the ear are lost and die
In one short hour, but that which strikes the eye
Lives long upon the mind, the faithful sight
Engraves the image with a beam of light."

But the gem of our poetical extracts I have reserved for the last. Nothing could be more to the purpose. In the following lines, Milton goes into detail with pre-Raphaelite minuteness. "Terrestrial humours" evidently mean developing agents! "Here in the dark" we all can appreciate. What photographer will assert that his productions are not "precious."

"When, with one virtuous touch,
The arch-chemic sun, so far from us remote,
Produces, with terrestrial humour mixed,
Here in the dark, so many precious things,
Of colour glorious, and effect so rare!"
Paradise Lost.

I hope and believe that the last line is prophetic; indeed, does not Tupper say, "To improve and to expand is ours," and does he not tell us "To be keen in catching likenesses."

In conclusion, if my readers will note any lines that strike them in their reading of the kind above indicated, and will send them to the Photographic News, I think I might take upon myself to say that the Editor will have pleasure in finding space for them to occupy. They will often meet with passages that, like the first developed photographs, will

"Start into light, and make the lighter start!"—Rejected Addresses.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Analysis, and Adulteration.

Lead *continued.*—The metal of commerce is never pure, but is liable to contain tin, antimony, &c. To get the pure metal, the easiest plan is to purify nitrate of lead, by repeated crystallization, and then to heat it in an earthen crucible, to expel the nitric acid. The resulting oxide of lead is then to be intimately mixed with one-fourth its weight of charcoal, and the whole heated in a covered crucible to incipient redness. On cooling, a button of pure metallic lead will be found at the bottom of the excess of charcoal. The physical properties of lead are too well known to require further detail. *Proto-oxide of lead* is a powerful base, and a knowledge of its chemical properties is of some importance in connection with the subject of pure water. The tarnish which forms on the surface when lead is exposed to the action of the atmosphere, consists of this oxide. It may be obtained in combination with water, by exposing a bright surface of lead to moist air, or by placing it in a flask containing an insufficient amount of water to cover it. If the water is distilled, oxidation goes on with rapidity, white flakes of hydrated oxide of lead being formed, and the water becoming saturated with that oxide. If a trace of sulphate of potash, nitre, or common salt be present, the lead merely becomes marked with a few isolated spots; and if the water contains a larger quantity of salt, only a slight tarnishing is produced. The amount of saline impurities present in London water, as supplied by the various companies, is generally sufficient to cause a preservative action; the metal becomes coated in the first instance with oxide; this is rapidly changed by the sulphates and carbonates present into sulphate and carbonate of lead, and further action ceases.

Oxide of lead may be prepared artificially in the hydrated form by dropping a solution of acetate of lead into an excess of ammonia till the precipitate becomes permanent; it must then be filtered, washed for a considerable time, and dried at the ordinary temperature; in this state it forms a white powder, which is seen to consist of transparent and colourless four-sided prisms when examined under the microscope; when placed upon red litmus paper it shows its alkaline nature by turning it blue. If shaken up with water for some time, about a ten thousandth part of the weight of the water dissolves, forming a solution of oxide of lead, which reacts decidedly alkaline, and has the following reactions: it becomes turbid when shaken up in a half-filled bottle, or, when boiled; it gives a brownish black precipitate when mixed with hydrosulphuric acid; it becomes turbid immediately with carbonic acid, becoming clear again, however, when the acid is in excess; dilute sulphuric acid, or a solution of sulphate of potash, causes a precipitation of sulphate of lead, and a precipitate is also produced when mixed with common salt or nitre. Iodide of potassium produces a white cloud, which becomes yellow when a small quantity of hydrochloric acid is added, a yellow precipitate gradually collecting; when it is rendered acid with acetic acid, and when chromate of potash is added a yellow precipitate of chromate of lead is produced. These reactions show that, although present in such excessively minute quantities, oxide of lead when in aqueous solution is still capable of producing very marked chemical reactions, and as many specimens of water used for drinking and culinary purposes possess strong solvent action upon oxide of lead, it is evident that a knowledge of the

reactions and behaviour of such a solution under different circumstances is of very great importance both from a sanitary and a photographic point of view. It is not necessary for water to be of equal purity to distilled for it to dissolve injurious quantities of lead, experiments which have been tried with great care showing that spring water containing about six or seven grains of salts to the gallon, when merely passed through a lead pipe a hundred and fifty feet long, takes up sufficient of the metal to give a brown stain with hydrosulphuric acid, and to produce many of the other reactions mentioned above. Before using lead pipes or cisterns for strong water, whether for domestic or photographic purposes, it should be tested by filling a flask half full with it, and then putting in several scraps of lead, scraped perfectly bright, in such a manner that part of the metal projects above the surface of the water. It should then be allowed to stand for at least 24 hours, and the appearance observed. If there is any turbidity in the water, any tarnish on the lead, or if the solution decanted (not filtered) from the metal produces any of the above reactions, especially that with hydrosulphuric acid, the water must, on no account, be used with lead pipes or cisterns. No specimens of rain water will stand this test, and frequently spring or river water will prove to be unsafe. As a rule lead pipes are unfit for conducting water when it contains less than $\frac{1}{5000}$ of its weight of salts, if the quantity of salts exceeds this limit, and if they consist chiefly of sulphates and carbonates, lead pipes may be used with safety; but if, on the contrary, they consist chiefly of chlorides, even twice the above quantity of salts is not sufficient to prevent the solution of some of the lead. We specified above, that in testing water for dissolved lead it was not to be filtered; the reason for this is that the act of passing through the filter paper seems to remove some of the oxide. It is also said that agitation with freshly-burnt finely-divided charcoal, or filtration through layers of this material, effectually removes dissolved lead, but we do not think that this statement is based upon sufficiently good evidence.

There is another oxide of lead which is much more generally known than the former; this is *red lead* or *minium*. This is prepared by heating the protoxide to a dull red heat in the air for a considerable time. Its composition is Pb_3O_4, or, as some chemists suppose, $2PbO,PbO_2$, a combination of two atoms of protoxide of lead with one of binoxide; and this view seems to be supported by the fact that weak acids, such as acetic acid, as well as nitric acid and sulphuric, extract the protoxide from it, and leave the peroxide. Red lead is well known as a crystalline granular powder, becoming darker when heated. The commercial article is very often adulterated with oxide of iron, red bole, or brick dust, besides containing all the foreign metallic oxides with which the lithage is originally contaminated. The adulterations may be easily detected by digesting the suspected article with warm dilute nitric acid, to which a little sugar has been added; the sugar reduces the binoxide, and the whole dissolves in the form of nitrate of the protoxide, leaving the adulterations behind. By boiling the residue in hydrochloric acid, the oxide of iron dissolves out, and leaves the brick dust and other insoluble adulterations.

RAPID MODIFIED TANNIN PROCESS.

If a simple, certain, and very satisfactory dry collodion process is still a desideratum, the following method has uniformly fulfilled these conditions, under circumstances of season, &c., more unfavourable to such results, than the writer has met with in the experience of some years' practice in the dry processes exclusively, for landscape photography.

The perfect retention and security of the collodion film is best insured, under all the many washings, &c., to which it is subsequently exposed, both before as well as after use in the camera, by applying a solution of india-rubber, with a camel's hair pencil, to the edges of the glass, shortly before pouring on the collodion. The want of complete adhesion between the film and the glass has often occasioned marks and stains in the negatives afterwards, which are most difficult to prevent or to explain, but from the access of water, &c., under the film, which was often observed in the first washings by its undulations. But there are two objections to the use of the india-rubber solution all over the plate instead of only at the edges of it as now employed: small dark specks are produced in the negatives, fatal to feeble skies and water subjects; and, in some instances, after printing pictures from them the films have cracked all over.

If the soft or hard water used for washing the sensitized plate is not very free from organic matters, it should be placed in a distilled water bath, which serves for many plates, until all *apparent* greasiness is removed, then wash well under a tap or a jug of water, and before quite completing this, pour on and off the plate three or four times a solution of common salt, 5 or 6 grains to the oz. of water, and finish the washing so as to remove the chlorides, and with a dose of distilled water afterwards or not, as may be necessary, before pouring in

The Exciting Solution.—This solution now contains two ingredients in addition to those previously employed, and for which the dry process is indebted to Major Russell and Mr. Bartholomew, in the tannin of the former, and the soda of the latter. 20 grains of gum arabic, 20 grains of sugar, and 1 grain of carbonate of soda are dissolved in 1 oz. of distilled water; and 20 grains of tannin and 1 grain of carbonate of soda are dissolved in another oz. of distilled water. These two solutions are made in separate bottles, as they do not keep well together in combination, and a few drops of spirits of wine may be added to each of them for better keeping in summer.

Equal parts of the above are mixed together for use, and merely poured once over the washed plate from an upper to a lower corner of it, and run off to waste, drained and dried for use without artificial heat.

The time of exposure in the camera may be about double that necessary for a wet plate, but under favourable circumstances even this difference is lessened, and an exposure given scarcely exceeding that in the wet process.

The developing solutions are:—

20 grs. of pyrogallic acid dissolved in 1 oz. of spirits of wine.

20 grs. of nitrate of silver dissolved in 1 oz. of Beaufoy's strong acetic acid.

Three or four drops of the former to each drachm of distilled water are poured on and off the wetted plate two or three times, and then as many drops of the nitrate of silver solution are added in order to bring out the picture perfectly. If the exposure has been a little too long, use less of the pyro; if too short, more of it.

The character of these negatives, as well as the good keeping qualities of the prepared plates, from the use of the salt, leave nothing to be desired in these respects. Greater limits as to time of exposure in the camera are allowable for dry plates as compared with wet ones, because a longer exposure for foliage and deep shadows does not necessarily involve the solarization of the high lights as in the latter, as the development is altogether much more manageable for dry than for wet plates under these circumstances. The only improvement of which this dry process appears to be susceptible, is that of making it quite as sensitive as the wet. Most of all, this is well known and proved by others, and by other methods, but never in my own rather long and varied experience, with such equally uniform and infallibly good results as by the above. E. T.

New Albumenized Paper.—M. Marion has recently introduced a new kind of albumenized paper, made in continuous sheets of any length, and the surface is coagulated. It is said to require a weak silver bath, and possesses many other advantages.

JOTTINGS FOR FEBRUARY,

FROM THE MENTAL SKETCH BOOK OF A PHOTOGRAPHER'S ASSISTANT.

In spite of its many tears, merry lads and lasses regard February as an ever-welcome friend, and long ere the venerated fourteenth day of its existence is ushered in, small boys and saucy girls, in numbers numberless, may be observed subjecting their nasal organs to a cooling contact with plate-glass in stationers' windows, whilst busy tongues discuss the merits of skewered hearts, flying Cupids, large-headed ladies' maids, and diminutive dandies, that are temptingly displayed to entice genuine or splenetic "lovyers," who are thus modestly reminded of St. Valentine, whose shrine they yearly heap with gifts, ranging from the elaborately painted and embossed billet-doux to the photographic absurdities that are manufactured in unknown regions, and tumbled into this degenerate world of ours, at the starveling price of one penny each.

Whilst cogitating on black-art monstrosities in general, our mind naturally reverted to the much neglected subject of harmony in connection with pictorial arrangements, and speedily elaborately illustrative remarks were springing into being at the touch of our mental pencil, when, on raising our head to distil from vacancy a breath of inspiration, the operations of our cerebrum were suspended by our eye, that had lighted on the heading of an article in the News, lettered in large type thus, "Alleged Early Photographs," and further in advance a small lettered row was going on concerning "Nitrate of Soda." "Meeting in the camp!" we exclaimed as we closed our sketch book, determined to have a voice in the matter.

The immortal Pickwick, having stumbled over what his excessive innocence suggested to be a relic of antiquity, set a scientific world in an uproar. The subject of many a fiery debate ultimately turned up as the idle scratchings of a clown. May not the facts respecting the worm-eaten camera (that is just now occupying so much valuable time) one day be brought to light in a somewhat similar way? If photographers are sighing for the adornment of their art with the musty, fusty, timeworn, and cobwebbed banners of a bye-gone age, imitate brother Sam by "going the whole hog" at once. Stay! A stroke of assistance from our pencil will bear you to the place whence fancy's mirror may reflect the spot, where once slow droppings fed the trickling rill that has grown into a widely diffused torrent mighty in its amplitude.

The rolling thunders follow soon, the lightning flash, and sturdy man is seen to quake, as gleam after gleam of sulphurous light illumines for a brief moment the frowning brow of an angry sky, whilst Jupiter looks on and smiles o'er the destruction proceeding beneath his feet, and mocks despairing voices that imploringly cry to Tonans for deliverance. Here we have it at once, actinism is but a nick-name for a somewhat modified electricity. A fossil deity has enjoyed the credit of inventing the subtle fluid, and was rewarded for his ingenuity by the addition of Tonans to his mythological honours. And is not that name (by the kindredship of sound) closely allied to an all-prevailing source of photographic difficulty? To be sure it is, "rest and be satisfied." The line of ancestry thus briefly drawn is as true in all its parts as scores that daily pass general muster.

When men look back the wheels of progress stay their course. Bold duty with uplifted voice cries onward, ever on, whilst the spectral finger-post of time reproachfully reminds us each inch of unreached ground before, bequeaths additional toil to generations still unborn, and the whisperings of a future speak of seasons when our labours must be regarded as a feature of the far gone past. To be cursed or blessed as occasion commands. But a truce to sentiment whilst we grapple with the difficulties that seem to attend the use of nitrate of soda.

A substance, whether simple or compound, that yields to the solvent influence of water, does not, as is sometimes supposed, unite itself by any chemical combination with the water. The duty the fluid has to perform is simply to overcome any resistance cohesive attraction offers, thus setting free unchanged atoms, whose dimensions when thus in suspension are too minute for the conception of human powers. Nevertheless, each particle in separate form exists, and it is of such a world is made. Now seeing that chemical combination builds up compound bodies by a process based on superior affinities, it becomes evident that in the natural operations of building or destroying, the most convenient opportunities must be enjoyed when the substances to be acted on are in a state of solution that enables the atoms to move about freely whilst being brought within range prescribed by the laws that govern the adhesive qualities of particles. If two substances of a similar nature are in molecular suspension in the same vessel, the atoms, although moving and jostling each other, no chemical change ensues, because there is no affinity, nor does cohesive power exercise its influence, although the atoms are brought within a range that would tempt any two substances that entertained the slightest regard for each other.

Leaving further remarks for a future, we proceed to illustrate what has already been advanced, by pointing to our friend Nitrate of Soda, whose symbols stand thus, NaO, NO_5, and nitrate of silver AgO NO_5. A comparison of these symbols make it at once evident that, however intimately the two associate, no chemical change will follow, as neither can contain a larger supply of nitric acid, nor have the bases any combining regard for each other. It is therefore clearly evident that the part played by nitrate of soda in sensitizing games must be purely mechanical, but a mixture of some foreign substance with the last-named article may bring about results of an unwished for nature. Take carbonate of soda, for example. In this case the soda robs silver of its warm mantle of nitric acid, and in return throws over to silver the flimsy garment of carbonic acid; the forced exchange is no sooner effected than silver assumes a visible form, and in a fit of sulks dives towards the bottom of the liquid. It needs no argument to prove that every atom of silver precipitated deprives the solution of so much of its vital power; nor does it require an effort of logic to show that a large quantity of carbonate of soda will "deteriorate" the working qualities of a sensitizing solution, to a greater extent than when a small portion is present, as the rules of combining proportion will in both cases be observed. Then the question arises—In what manner will the influence exercised by a solution that has been impoverished of silver extend itself where nitrate of soda has to take a part? Our theory at once tenders a reply. We have there a supposition that is now proved a true solution of an apparently difficult problem. If the substance last named loosens the interstices of an albumen surface, sufficient silver must of necessity be present to cement them by "coagulation" immediately, or a portion of the albumen dissolves out at once, and a spotty picture must follow, by the irregular patches of the organic substance that remains on the surface of the paper. It matters not whether the decomposing agent be carbonate of soda or any other substance, the same results must occur.

We have recently undertaken a search for failures, and have forwarded to the Editor of the News a few prints that will support some of our statements above tendered:—

No. 1. Silver was precipitated by mixing carbonate of soda with the nitrate; picture much mottled.

No. 2. Matters improved by adding more silver.

No. 3. Perfect. By dissolving the precipitated carbonate of silver with nitric acid. The acid here turns the new lodger carbonic acid out of its quarters, and takes its place, thus forming anew the nitrate of silver, and restoring the solution to its original strength. The nitric acid was added drop by drop to prevent acidity of the solution, which precaution is shown to be prudent by example No. 4, which proved difficult to print and troublesome to tone. Bath in this case decidedly acid.

Whilst engaged in the above enumerated experiments, it occurred to us that, with a bath so concocted that the silver should be held in quantity superior to nitrate of soda, the problem of weak silver baths would be nearer a satisfactory solution. Acting upon this idea, after several experiments, we selected the following for a comparative trial:—

Nitrate of soda ...	... 10 grains.
Ditto silver...	... 20 „
Water	... 1 ounce.

We forward specimens of results, which, with the others, will doubtless be commented on by our respected Editor, who, we venture to predict, will acknowledge that the part played by nitrate of soda is something more than nonsensical or imaginary.

[Amongst the examples forwarded, the whole of which bear out our correspondent's statements, we are especially struck by the marked character of some of the specimens. There are three card prints from the same negative; the first of which is excited on a bath containing 20 grains of silver to the ounce, and nothing more. This is flat, poor, and feeble, much of the albumen apparently removed. The next is excited on the same bath, with the addition of 10 grains of nitrate of soda to the ounce; the print is rich and brilliant, and the albumen surface is undimmed. The third is excited on a 40-grain bath, with 10 grains of nitrate of soda; it is scarcely distinguishable from the second, but may possibly be very slightly richer. Another print, on the same paper as the first, with the 20-grain bath, with 10 of nitrate of soda, is rich and brilliant, the albumen surface being perfectly retained. These are very definite facts, however they may accord with preconceived theories, or apparent chemical necessities of the case.—Ed.]

POSITIVE PRINTING WITHOUT SILVER.

BY PAUL LIESEGANG.

German chemists have been much occupied lately in seeking a printing process in which nitrate of silver can be replaced by a less costly substance. We have received a large number of proofs, many of which are so similar in appearance to those produced with chloride of silver that it is difficult to detect the difference, except by chemical analysis. Some of these processes are kept secret, but we are happy to be able to communicate to our readers the process of M. Obernetter, of Munich. The experiments of Dr. Schnauss, and those we have ourselves made, and the proofs the inventor has sent us, encourage us to believe that this process deserves to be introduced into practice, and we strongly recommend our readers to avail themselves of their leisure hours to communicate to us the results. The process is as follows:—Float the positive paper for two minutes upon a solution of

Water	1 litre	(35½ ounces).
Solution of sesquichloride of iron, sp. g. 1·53 to 1·6	13 grammes	(200 grains).
Chloride of copper, crystallized	100 „	(1,543 grains).
Pure hydrochloric acid, concentrated	12 „	(185 grains).

Dry the paper in the dark.

This paper possesses very singular properties: sheets prepared two years ago give as good results to-day as when it was freshly prepared. Its sensitiveness is one-third greater than that of albumenized paper. The proof, when printed, is of a faint yellow. It must be fixed within one or two hours; if not, the picture is lost. After four and twenty hours there is no trace of a picture left upon the paper, and a new one may be taken upon it.

To develop and fix the picture, it is immersed in the following bath:—

Water... ...	1 litre	(35½ ounces).
Sulphocyanide of potassium	8 to 12 grammes	(120 to 180 grains).
Concentrated sulphuric acid	1 „	(15 grains).
Solution employed for preparing the paper	10 to 20 „	(150 to 300 grains).

The proof is floated on this bath for three or four minutes, and then completely immersed in it; a second proof can be floated during the same time, and also immersed; and so on with the rest of the proofs until no more remain to be placed in the bath.

This liquid is very stable, it even improves by use; the portion absorbed by the paper is replaced by fresh solution.

In this bath sulphocyanide of copper is precipitated upon those parts of the paper upon which the light has acted. The action is proportional to that of the light, so that the finest details are rendered perfectly.

The time during which the proofs are left in the bath depends upon the method we intend to employ in the toning; it varies from five to thirty minutes. If the proof remains for four and twenty hours in the bath the picture shows itself in relief. We can thus obtain a relief two lines in thickness in the deepest shadows.

The proof is next washed in pure water from fifteen minutes to an hour; it may be left in it a whole day, but an hour is always sufficient. It is good to change the water sometimes. The proofs may be toned immediately, or they may be dried, and toned at any future time.

The picture now consists of sulphocyanide of copper: it is easily changed, chemically, to obtain any colour desired.

The following processes yield excellent results:—

§ 1. After washing the proofs, immerse them in a solution of red prussiate of potassa, strength from 6 to 12 per cent.

The proofs acquire a very intense red hue.

After seven or eight hours, the hue has become very intense and velvety, while the lights remain quite white. Immediately the proofs have attained the desired hue, they are well washed in water until it passes off clear. A half-hour's washing is sufficient.

To obtain the hue given by chloride of silver to pictures, they are left only an hour in the prussiate, then well washed and immersed in the following bath:—

Water	200 to 300 cubic centimetres
Protosulphate of iron	100 grammes
Perchloride of iron ...	40 „
Hydrochloric acid ...	80 „

The red proof becomes violet red, violet blue, black, greenish black. Immediately it has obtained the desired hue, it is washed in acidulated water, and dried.

The proofs may be left in this bath until they acquire the greenish black hue, and afterwards immersed in a very dilute solution of sub-acetate of lead.

If, after being dried, the proofs are covered with albumen, it is impossible to discover any difference between them and the best silver proofs upon albumenized paper.

The inventor explains the theory of this process in the following terms:—

There is upon the prepared paper sesquichloride of iron and chloride of copper (Cu Cl), the latter in excess. By the action of light, the sesquichloride of iron ($Fe^2 Cl^3$) is reduced to the state of protochloride (Fe Cl). The chloride of copper is not yet reduced. If, after being dried, the proof is kept in an absolutely dry place, the picture remains. In a moist atmosphere the protochloride of iron attracts moisture, and is decomposed by a part of the chloride of copper, forming sesquichloride of iron ($Fe^2 Cl^3$), and chloride of copper ($Cu^2 Cl$). If the proof is not in a short time immersed in the solution of sulphocyanide, the $Cu^2 Cl$ is changed into

Cu Cl, and the paper is then in its primitive state, and is again sensitive.

But there is still some protochloride of iron in the proof: when it is immersed in the solution of sulphocyanide, it immediately deposits insoluble sulphocyanide of copper upon the reduced parts, while, upon the non-reduced parts, soluble sulphocyanide of copper is formed, which is dissolved in the excess of sulphocyanide of potassium.

If the proof is a little yellow upon being removed from this bath, the hue will change in the washing. The red colour of the proof is due to the formation of ferrocyanide of copper; the violet is caused by a partial formation of *Turnbull's blue.*

§ 2 We can easily obtain carbon pictures by submitting the proofs, as they are taken out of the water, to an atmosphere of chlorine. The sulphocyanide of copper is then changed into chloride of copper. It is a well known fact, that we can easily carbonize paper impregnated with a metallic solution. A temperature of 300° to 340° Fah. is sufficient in the case in question.

The proofs are placed in a tin box heated to 400°: by this treatment they acquire a marroon brown hue. After that they are glued upon card board, because the strong heat has rendered the paper rather friable.

§ 3. A brown black hue may be developed on the proofs by treating them, after washing, with an ammoniacal solution of hypermanganate of potassium. With this developer, the time of printing may be abridged.

§ 4. A dilute solution of nitrate of silver also yields beautiful proofs. The exposure must be very short. The addition of various acids changes the tone.

These proofs are fixed by washing them in water, containing a small quantity of oxalate of ammonia.

A process for obtaining proofs in Turnbull's blue has been communicated to us by Professor Schwarz, of Breslau. A mixture consisting of—

Perchloride of iron, neutral, and crystallized	78	grammes
Oxalate of ammonia, crystallized ...	71	,,
Red prussiate of potassa	73	,,

dissolved, in the dark, in 10 litres of water, serves for the preparation of the paper. The solution is of a greenish brown; immediately it is exposed to the light, it forms Turnbull's blue, which is very permanent in the light and air. Upon exposing paper prepared with this mixture, in a moist state, to the light, under a negative, a very beautiful deep blue colour is formed; the proof is fixed by simple washing.

Professor Schwartz thinks that calico printers might avail themselves of the mixture mentioned above, to fix Turnbull's blue upon stuffs, by exposing them to light merely.—*Le Moniteur de la Photographie.*

ON THE RESTORATION OF FADED PHOTOGRAPHS.

BY H. J. GODBOLD.*

The number of yellowish photographic prints, which we are constantly in the habit of noticing in their various stages of consumption, is sufficient excuse for an attempt being made to arrest the malady, and, if possible, to restore somewhat of the original beauty. And when we consider that in nature there is no such thing as annihilation, but only a changing from one form to another, we feel certain that some means is yet to be discovered by which our faded photographs may be re-endowed with all their original brilliancy. The knowledge that the picture is formed by a combination of a metal like silver is sufficient to assure us that, although the visible picture is fading from our sight, yet the actual pigment, so to speak, is merely assuming a different form. When we are able to understand the exact chemical changes which are taking place, we shall, perhaps, be better able to restore the prints to their original condition. This is the object I wish especially to bring under your notice, so that the perfect restoration of photographs may became a more general subject for experiment.

There are many descriptions and grades of fading, for the cure of which different means must be employed.

Having experimented in this direction, and having in some cases obtained partial restoration, I have brought some of the results and failures to lay before you. The description of print with which I have succeeded best has been that kind toned with gold and sulphur. That toned with sulphur alone I have not been able to restore, but, on the contrary, have caused rapidly to vanish.

I may here state that I do not consider the results entirely satisfactory, but that at the request of some members of this Society I agreed to mention the manner in which I had worked so as to open a discussion on the subject.

The following is the way in which I have treated these prints:—I made up a solution of bichloride of mercury, one grain to the ounce of water, poured into a porcelain dish, into which the yellowish prints were immersed—generally one at a time—and in a few minutes the change has been complete, the yellowness has disappeared, but the tone has become redder. I exhibited a print treated in this manner at this Society's meeting in May, 1861, but as I was informed that the process was well known, but its stability was questioned, and was at that time very doubtful, I took no more notice of it; but I have here that same print in the same condition as when it was exhibited, in this room, three years ago, so that there is not so much doubt now. I was led to try the effect of the bichloride of mercury through having restored some prints which had been spoilt by carelessness in toning, and for mere experiment immersed some faded prints in the same solution without expecting any results. I was somewhat surprised to find them immediately improved, the yellowness being entirely removed, and the grey tone becoming warmed. I do not think that the tone of these pictures will be generally liked, as it is in some cases too warm. I have found that for some prints a very weak solution answers best, the saturated solution making them washy immediately; but this only occurs to those which are not improved by mercury.

These prints are exhibited under great disadvantage, as the gas-light does not show the yellowness of the faded prints, and increases the red tone of the restored ones.

A very remarkable point is the effect that one print has produced upon those next to it. It has imparted somewhat of its own hue, and that through the paper. This has most likely been caused by the bichloride not being sufficiently washed out. As bichloride of mercury is not a very soluble salt, a great deal of care must be used to dissolve it out.

I have here some prints, parts of which have been restored with more or less success, and others which have been bleached by the same process.

There are many other experiments I have made in this direction, but as they have not resulted in anything satisfactory, I need not weary you with a detailed account of them.

I have to thank those gentlemen who have kindly supplied me with fading and faded photographs, for experimenting upon, and to the members present, for their attention to this string of rambling remarks on a dry subject.

* Read at the North London Photographic Association, on the evening of Wednesday, Jan. 20, 1864.

HOW TO COPY BY MEANS OF THE CAMERA.

Being Short Lesson in Photography.—No. 19.*

In the last lesson we described the method which we follow when copying either photographs, prints, engravings, or ambrotypes and daguerreotypes, and we stated therein some of our reasons for preferring this mode of copying to that by dif-

* From *Humphrey's Journal.*

fused light. Another reason we will mention here; it is this: Having an abundance of light, you can use the smallest stop, and thus have the whole benefit of the correction for spherical abberration at the same time. It sometimes happens that, by this expedient, an irreproachable copy can be obtained with a lens, which is very poor and faulty when used without the stop; in fact, such a copy can be thus obtained as cannot possibly be obtained otherwise.

Still, as we have already remarked, some prefer copying by means of diffused light, and it becomes our task to teach you the best method of doing this under the circumstances.

The lens for copying by means of suffused light must produce a sharp picture on the ground glass even with a large diaphragm. A defective lens can never be used for this sort of work. Satisfied that your lens has not only a good character, from the fact that it brings with it testimonials from a reputable manufacturer in optics, but that from experience you know it has already produced work pronounced by judges to be nearly perfect, our next duty is to arrange the light.

Arrange the light?

Yes, arrange the light!

When using the light, direct from the sun, in the last lesson, we did not require any arrangement further than that of allowing the print about to be copied to be suffused with this light; for all minor lights from reflecting surfaces at a distance are so infinitely minor to that of the sun, as to require no occlusion of these satellites from the field of view. But in the present instance, where we are now dealing with diffused light alone, the reflections are nearly all of equal intensity, and thus tend to neutralize each other's effects, by producing confusion.

The arrangement of the light, therefore, consists in illuminating the print by light coming in *parallel rays in one direction only*.

Shall we place the print beneath the skylight?

Certainly not: because, through the skylight, rays proceed from a quarter of the heavens, or a whole quadrant.

We will, then, place the print close to the side window, and raise one of the sashes; will that do?

Just as bad as before, perhaps worse; for now you have reflections of a great variety of intensity, from the brick buildings across the way, from the green foliage on the trees, from the glass windows, from the roofs of the houses, the sand and clay in the street, and hundreds of other objects; you will find it much better for your purpose to shut out all the light from every crevice, from the skylight and the sidelight, and then get the joiner to cut out a hole in the window shutter; to this hole nail on one end of your coat sleeve; pull out the sleeve so as to extend it into a cylinder, and look through it; you may now see the stars in broad daylight, and all this, because the light that emanates from the stars alone penetrates the the coat sleeve; with such an arrangement you might, with a little patience, even see the man in the moon at his prandial occupation.

The light that passes through the sleeve will more effectually illumine the print for the purposes of copying, than all the rays of broad and diffused daylight.

Look at the print as it is thus illumined, and examine the different parts minutely; you will discern points, lines, and markings now on its surface, just as you descry the stars when looking through the shaft of a chimney, stars that are invisible in daylight by reason of too much light, or rather too much interference of light; and here points, lines, and markings that will be totally obscured if you take the print into the next room. A print so lighted up can be photographed with the greatest advantage by diffused light. This sort of light is next to that of the sun; the only difference is its want of intensity; this requires a longer exposure.

Although some astronomers make celestial observations through coat sleeves, for want of liberal donations for the erection of suitable observatories, we regard it as altogether *infra dignitatem* for one who prosecutes the study of sun-drawing to thus demean his noble cause. The sleeve served the purpose of explanation; a principle has thus been evolved; the efficacy of a single light has been demonstrated.

It remains, therefore, to arrange a wooden cylinder in a dark room, some three or four feet in length, fixed to the window shutter, and capable of being turned, as it were, on an axis, to a white cloud in the hemisphere. The light that thus passes through the cylinder comes in parallel rays, and enters the dark room as a beam of homogeneous light.

Fix the print or photograph to be copied in this beam, and arrange the print so that the reflected beam can be taken up by the lens of the camera, and focus the picture. You will find it to be quite a pleasure to focus such a picture; there is no confusion of light, no dazzling, nothing indistinct.

If such an arrangement be found inconvenient, the next best is to close the shutters of the side-light, and to have a small sliding valve or aperture made in one of the panels, and to receive the light through this upon the plate placed at a distance of a foot or two from the opening, and lower down than this opening, in order that the light from the sky alone can penetrate.

The time of exposure with the same stop will be many times longer than when the sun's light is used; this time has to be learned by practice.

The mode of focussing in this case, however, is more difficult than before, because the illumination is less brilliant; a magnifying glass, of course, is required, in order to obtain a sharp copy.

All the preceding remarks refer to the art of copying prints, &c., by means of reflected light; another method of copying with the camera is produced by the instrumentality of transmitted light. In this case, the prints to be copied are glass transparencies, that is, positives on glass, such as stereoscopic slides, &c.

In every case of copying thus with the camera, the copy will be the reverse of the object: that is, if the print be a positive, the copy will be a negative, and *vice versâ*. Nevertheless ambrotypes may be taken of any object, and will thus be *facsimiles* of it without any further preparation.

Stereoscopic glass slides are copied preferably by means of the dry-plate process, in which case they are placed in juxtaposition with prepared dry plates. The art of doing this, we will teach you in some future lesson. But they may be copied by means of the camera, and the wet collodion process; and as we are now dealing with this subject, we may as well exhaust it.

For this purpose, we have a long cylinder of thin wood, blackened in the inside with ink, in one end of which the copying camera can slide. The other end of the cylinder is closed up with a thin board. In the middle of this board there is an oblong opening of the size and shape of the stereoscopic glass slide, with a narrow flange all round, upon which the slide can rest, and where it is firmly held in place by means of small pins stuck in obliquely. The slide is fixed in this aperture wrong side up, the collodion side looking inwards.

If you know the equal conjugate distance of your lens, fix the camera tube at this distance from the slide, and draw out the bellows part of the camera to an equal distance on the other side, and proceed to obtain a sharp-focussed picture on the ground-glass. To do this, the camera has to be shoved backwards and forwards in the cylinder until the picture is sharp. If the size of the picture be now equal to that of the original, bind the camera and the cylinder firmly together, and introduce the sensitized collodion plate. Direct the cylinder so as to receive the light from a white cloud, and expose.

The object of the cylinder is to exclude all diffused light, and to allow only parallel rays to arrive at the lens after they have passed through the transparent slide.

MOUNTING PHOTOGRAPHS.

S. J. Thompson's Plan.

Mr. Thompson, like most other photographers who are doing a large business, trims the prints before toning. Independently of the great saving of the silver and gold, and while the trimming is just as easy before toning, there are other important advantages. The prints are in a good shape to handle and to examine, are more sure of an efficient washing, and are left finally in a better state for pasting.

Trimming.—Mr. Thompson uses a rectangular steel cutter, of the outline of the desired print. A single blow with a wooden mallet upon the head of the cutter properly adjusted on the print, leaves the paper truly and uniformly cut. This way of trimming is very expeditious, and the cutter, when used with ordinary care, lasts a long time.

Drying the Prints.—After toning and washing, the prints are only partially dried. The prints are taken out of the washing water, and laid one by one in a portfolio of blotting paper. When all are placed in the portfolio, the book is shut up and run under a press. Thus in a few minutes, the prints, being sufficiently dried, are taken out and arranged in piles of one or two dozen, and—

The Pasting begins. The paste is laid on the topmost print

of the pile with a broad, flat brush. The prints all being moist, there is little danger that any overflowing paste will do damage to those lower in the pile. The pasted print is laid on the card, and now comes Mr. Thompson's handsome contrivance for

Smoothing.—A piece of dried paper is laid on the print, and there is brought down upon the card an india-rubber roller, suspended by a spring from the ceiling. The roller is operated by the hand, and on going over the card two or three times the print lies flat and true. The roller is attached to a vertical wooden rod, and this rod is hinged near the ceiling to a horizontal elastic bar fixed at its remote end into the ceiling; the arrangement is thus similar to the old-fashioned well sweep.—*American Journal of Photography.*

Proceedings of Societies.

London Photographic Society.

The annual meeting of this photographic society was held on Tuesday evening last, Dr. H. G. Wright in the chair.

The minutes of a former meeting having been read and confirmed, the following gentlemen were elected members of the society:—Messrs. W. Griggs, Marion, Rolfe, and Oldfield.

The Chairman then announced that this, being the annual meeting, the officers would be elected in accordance with rules 6 and 7 of the society.

As no other nominations had been made, those gentlemen proposed by the council in December were *de facto* elected without further proceeding. The names of the officers elected, or re-elected, were as follows:—President, the Lord Chief Baron; Vice-President, Col. Stuart Wortley; Hon. Treasurer, Mr. Hamilton; new members of the council, Messrs. J. P. Gassiot, J. Spode, Sebastian Davis, H. Pollock, Warren Vernon, and E. Underwood.

The Secretary then read the report of the council, which expressed regret that the expenses of the year had exceeded the income, a circumstance chiefly due to the heavy loss on the last exhibition. This loss was chiefly due to the unsuitable season at which the exhibition had been held, the council having been unable to get a suitable room at the proper season of the year. The council had pleasure in announcing that they had, for the exhibition of the coming year, secured suitable rooms during part of the spring and summer months. The exhibition would commence in the second week of May, and continue during June, July, and part of August, in the gallery of the Female Artists, in Pall Mall. He ought to add that the society was much indebted to Mr. Durham for his aid in securing the room for the sum of £70, as, without his influence, they would not have secured it for less than £100.

Mr. Shadbolt moved, and Mr. Sedgwick seconded a vote of thanks to Mr. Durham for his aid in securing suitable rooms at a reasonable price for the exhibition.

The Secretary read a letter from Col. Stuart Wortley as follows:

"My Dear Doctor,—Pursuing my experiments touching the value of formic acid in the iron developer, I find the best combination to be a solution of *ammonio*-sulphate of iron, and acetic acid, with formic acid added shortly previous to use.

"One very valuable quality is the intensity obtained in the first development, as a proof of which I enclose four prints from different negatives, all taken one day last week; the developer is only *once* poured on to the film, and the necessary intensity is secured in a few seconds. No second quantity of solution was required for these negatives, and although the day was not a very bright one, the exposure was rapid. It is noticeable how well the hands, wristbands, &c., keep their proper relative tone.—Truly yours, H. Stuart Wortley, Lt.-Col."

The letter was accompanied by some exceedingly fine prints, illustrating the value of the developer.

The Secretary called attention to a very fine photograph, by Mr. J. Eastham, of Manchester, of Manor Heath, Halifax, from a tannin negative 18 in. by 16 in; also to a portfolio of prints, by Messrs. Sedgfield and Eliot, illustrating the value of weak printing baths, the prints, which were very fine, having been produced with a 40-grain bath. Also to a portfolio of prints exhibited by Mr. Squire, to illustrate the working of his improved Shepherd lens, especially a rapid lens for card pictures. The Secretary read a letter from M. Marion, calling attention to an example of a new method of preparing albumenized paper, the surface of which was insoluble. A large economy in silver, and variety of other advantages were claimed for the paper. The letter also called attention to some samples of sensitive paper, the mode of preparing or dealing with which was not explained. Members were invited to take home samples for experiment.

Mr. Henry Cooper, jun., then read a paper on "Artistic Printing," which was illustrated with several very fine specimens.

After a vote of thanks to Mr. Cooper, and a few conversational remarks,

Mr. Hanbury explained some improvements he had effected in his washing apparatus, described on p. 582 of our last volume. He said:—The method of obtaining successive changes of water which first suggested itself to me, was to use a syphon capable of drawing off the water, when it reached a certain height, more rapidly than it was being supplied. It seems that this plan has been adopted by various persons. For several reasons I gave the preference to the rocking-trough, and dismissed the syphon from my mind. Its use was, however, again suggested to me by Mr. Shadbolt on the publication of my first paper; but it was not until several weeks later that it occurred to me that a syphon might be *combined* with the rocking-trough in such a manner as to be at once almost perfect in action and admirably simple in structure.

Since the level of the water at the end of the trough at the moment before it descends is *at least* an inch lower than at the moment after its descent, it is only necessary to place a syphon against each end of the trough, with its apex above the lower and below the higher level of the water; the shorter leg being bent in the necessary form, and made to enter the trough through the bottom close to the end, the longer leg being allowed simply to project an inch or two below the bottom. It is obvious that as the water rises in the trough, so it will rise in the shorter leg of such a syphon, and when the trough descends, it will pass the bend into the longer leg, and thus the syphon will be set in action and will draw off the *whole* of the water. But since its action will cease as soon as the water is drawn off, the small quantity which may subsequently drain from the pictures will not escape as it would through an open valve. This slight imperfection, however, will no doubt be compensated by the syphon being cheap and incapable of getting out of order.

Experiment renders it probable that, in place of supporting the diaphragms in a grooved frame, it will answer better to have a rib along both sides on one surface of each plate, and to keep the plates vertically over each other by a simple rigid frame.

After a vote of thanks, and some conversation,

The Chairman read a letter from the Chief Baron, stating that he would be able to attend the meetings after the Spring Circuit, and expressing a hope that the society would not hesitate to elect a better president, if desirable. The Chairman remarked, that he scarcely need ask the society's opinion in the matter, as he was certain there would be but one voice for retaining the Chief Baron as their president. (Applause.)

Mr. Cooper wished to mention his experience on one subject in the use of resinized paper. Some persons had complained that the prints had a tendency to discolour. He had had a large number through his hands, and had noticed that those washed finally with boiling water never discoloured, whilst those not so treated had a great tendency to do so. He would be glad to hear other experience on the subject.

The meeting then adjourned.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, February 3rd, 1864.

Dr. Schnauss, president of the Photographic Institute of Jena, has examined a set of photographs printed without the use of salts of silver, by M. Wothly, the eminent photographer of Aix la Chapelle, whose invention has been alluded to from time to time in the columns of the Photographic News. Analysis shows that the finished picture consists of gold, which covers a thin film of collodion, and consequently presents all the requisite conditions of permanence, more especially on account of the absence of hyposulphite of soda.

The iron and phosphate of lime, revealed by analysis, are inherent in the paper. It is quite certain that M. Wothly employs other substances than the salts of gold, but they are either eliminated in the washing, or reduced and rendered insoluble by the action of light. As to the beauty and artistic perfection of M. Wothly's pictures, there is but one opinion, and that is most favourable.

At a recent meeting of the Vienna Academy of Sciences, Herr d'Ettingshausen presented a copy of a work he has just published, entitled "*Photographic Album of the Flora of Austria, which may at the same time serve as a Manual of Botany.*" This is the first time that the new and important aid of photography has been applied to the advance of botanical science, in the photographic representation of plants. Hithert›, it had been impossible to obtain good photographic pictnres of plants: the images were black, silhouettes, without shades, on account of the green colour of the objects represented being deficient in actinic power. Last year, in reporting upon the recent progress made in *autophysiotypy*, or nature-printiug, the author communicated to the Academy that the Imperial printing office had succeeded not only in obtaining good photographs of plants, bnt also in engraving them so as to obtain printed copies. The work named above is the practical realization of this admirable process. It embraces a complete collection of characteristic species of almost every family of the Austrian flora; instead of the usual woodcuts inserted in the text, the illustrations are photographs.

The "glorious uncertainty of the law" is strikingly displayed in the opposing decisions delivered in our several law courts in cases of photographic piracy. One day it is held that photographs *are* works of art, and entitled to copyright, with protection in the same manner as engravings; on another it is ruled that photographs are mechanical productions, entirely devoid of art, and the injured plaintiff is nonsuited, and mulcted in all the costs.

In a recent suit, M. Disderi claimed damages to the extent of 60,000 francs, against certain publishers who had copied some of his most popular photographic portraits. The counsel for the defendants maintained that M. Disderi had no legal rights; that a portrait belonged to the person it represented; and M. Disderi had not shown that he had permission from the originals of his portraits to publish and sell exclusively; and also that it was necessary for M. Disderi to prove that he had taken the portraits himself.

The Imperial advocate, without going into a discussion on these questions, proceeded to inquire if the penal law of 1793 were applicable to photography; and rnled that it could not be, seeing that this art came into existence only some fifty years subsequently; that the works of art protected by that law could not be classed with photographs, for the Legislature had desired to accord its protection only to the literary and artistic manifestations of thought, and not to the idea itself; and that in photography the execution or manifestation is purely mechanical. He concluded by asking the jnry to give a decision on principle, which might perhaps have the effect of drawing the attention of the Legislature to a serious and important question affecting very large commercial interests.

The judgment of the court was delivered in the following terms:—"That the law of July 19th, 1793, in granting to authors, composers, painters, and designers the sole privilege of disposing of their works dnring their lifetime, evidently had the aim of protecting works of art, the fruits of the thought, intelligence, and genius of man.

"That the products obtained by the aid of photography do not present the essential characteristics of works of art, that they require a certain manipnlatory skill in the employment of the photographic apparatns, displaying sometimes the taste of the operator in the choice and arrangement of the subject, or in the pose of the model. They are, in fact, the result of mechanical processes only, servilely reproducing material objects without artistic talent being necessary to obtain them.

"Seeing, therefore, that the card portraits of which Disderi claims proprietorship are not protected by the law of 1793; and that, consequently, their reproduction does not constitute an act of piracy, for which he can claim damages, the plaintiff Disderi is hereby nousuited, &c., &c."

In the first cause, tried in June, 1847, it was decided, that photography being a mechanical art, its products were under commercial jnrisdiction. The same court, in March, 1861, proclaimed the principle that as photography does not create, it cannot constitute a property. On the other hand, another court, in July, 1861, condemned a confectioner who had covered his *bon-bons* with copies of some of Mayer and Pierson's photographs. The court of Turin, in 1861, in the matter of copying a portrait of King Victor Emmanuel, refused to recognise that a photograph was a work of art.

In Jannary, 1862, the Correctional Tribunal of Paris clearly laid down the same principle *à propos* of portraits of Lord Palmerston and Connt Cavour, made by Mayer and Pierson, and copied by M. Betbeder.

This jndgment was appealed against. Photography, nobly defended by M. Maric, nearly gained its cause on the 10th of April, 1862. The court decided that photographic productions *may, in some degree, be the products of the mind, thought, taste, and intelligence of the operator.* In fact, Mayer and Pierson gained their suit, the court recognising that the portraits made by these gentlemen possessed an artistic character.

This decree was, however, rejected by the Court of Cassation in November, 1862, so that it became impossible to say whether photography was artistic or not in the eye of the law, and this uncertainty is very unsatisfactory for commerce. The doubt and indecision prevailing on this subject will, doubtless, hasten legislative action so as to place the matter on a more satisfactory footing.

AURO-CHLORIDE OF SODIUM.

Dear Sir,—There is a pertinent question that very few persons have not heard asked some time or other, viz., "When doctors differ, who is to decide?" but, often as it has been put, I never knew it elicit an answer. We find Fownes, who is universally quoted as a good authority, stating, respecting the formation of double salts, that "the two bases are never taken from the same isomorphous family." His seventh family consists of only five members, viz., *sodium, silver, gold, potassium,* and *ammonium;* therefore, according to Fownes, no two of this family can by chemical combination form a true double salt. The note you appended to my communication, p. 50 of the last number of your journal, shows that Brande, who is likewise considered a good authority, states exactly the reverse; you also name *sel d'or*, and the *double tartrate of potassium and sodium*, in further proof that Fownes is wrong in the law he mentions. Taylor's edition of Braude, in addition to the qnotation you gave, says:—"*Iodides* and *bromides* of gold, corresponding to the chlorides, have been formed. These also produce double salts with the *electro-positive iodides and bromides.*" Again, in speaking of chloride of silver, he says:—"It is soluble in strong solutions of the chlorides of the alkaline metals, forming with them crystallizable double salts." In opposition to this statement, we have "Watts's Dictionary of Chemistry," telling us, "there is reason to believe that all such bodies as Na Cl, Ag Cl, are not, strictly speaking, chemical individnals, but that they are combinations of entire molecules, as such, held together by a force analogous to that which causes certain salts to combine with water of crystallization; and the chemical properties of their constituents are not modified to the extent which nsually accompanies true chemical combination." I must candidly confess that I am more inclined to place reliance in this statement, than in that of Braude.

Fownes not only gives the formula for *tartrate of potassa and soda*, commonly called *Rochelle salt*, but adds:—"A salt corresponding to Rochelle salt also exists, having oxide of

ammonium instead of soda;" thus *apparently* contradicting at p. 566 the rule he gave at p. 266; he may not, however, consider these to be *true* double salts. He names ferrocyanides of *magnesium, calcium, zinc, manganese, nickel, cobalt,* and *copper*, all of which metals, including iron, belong to his second isomorphous group; but in speaking of ferrocyanogen and its compounds, he says, "The ferrocyanides are often described as double salts, in which protocyanide of iron is combined with other metallic cyanides, or with cyanide of hydrogen. Thus hydroferrocyanic acid is written Fe Cy, 2 H Cy, and ferrocyanide of potassium Fe Cy, 2 K Cy + 3 HO, the oxygen and hydrogen of the water of crystallization being respectively adequate to convert the metals into protoxides, and the cyanogen into hydrocyanic acid. This view has the merit of simplicity, and will often prove a useful aid to the memory; but there are insuperable objections to its adoption as a sound and satisfactory theory."

Let us now see what *Watts's dictionary* says on the subject: "Cyanides have a strong tendency to unite with one another, and form definite compounds, called *cyanogen salts* or *double cyanides*, analogous to the iodides, bromides, and chlorides. The most numerous of these double salts are the compounds of the alkaline cyanides, with the cyanides of the heavy metals." And again: "*protocyanide of gold* dissolves in the alkaline cyanides, forming double salts called *aurocyanides;*" and we have named aurocyanide of ammonium and aurocyanide of potassium; likewise, cyanide of silver and ammonium, cyanide of silver and potassium, and cyanide of silver and sodium. Dr. Löwig gives also an *aurocyanide of silver*. According to Fownes, not any of those compounds are *true* chemical double salts; and it appears from Watts's dictionary that *all* double cyanides are not considered as such, for we are told—"On account of the different behaviour of the double cyanides with acids, it is usual to divide them into two classes. 1st. The *easily decomposable double cyanides*, which give off hydrocyanic acid when treated with a stronger acid, even in the cold. These are regarded as true double salts, that is to say, as compounds formed by the addition of two simple cyanides, *e.g.*, cyanide of nickel and potassium. 2nd. The *less easily decomposable double cyanides*, which, when treated with acids, do not evolve hydrocyanic acid, but merely exchange their alkali-metal with the hydrogen of the acid, as is the case with the double cyanides of iron, chromium, cobalt, and manganese. In these compounds the cyanogen is usually supposed to be more intimately combined with the heavy metal, forming a compound radicle, which, like chlorine or cyanogen itself, can unite with metals, forming salts which are decomposed by acids, and yield the hydrogen-salt of the same compound radicle. Thus the yellow cyanide of iron (ferrosum) and potassium is regarded as the potassium-salt of the radicle *ferrocyanogen;* hence it is called *ferrocyanide of potassium*. Similar compound radicles are supposed to exist in the double cyanides of chromium, cobalt, and manganese. This view of the composition of the second class of double cyanides is convenient when a particular class of reactions is under consideration, viz., the interchange of the alkali-metal of the double cyanide for hydrogen, or for a heavy metal; but it is by no means necessary to regard them in this way; in fact, the behaviour of a double cyanide with acids appears to depend rather upon the peculiar nature of the heavy metal contained in it than on any particular molecular arrangement."

The question, therefore, resolves itself into this, *What constitutes a true chemical double salt?* and upon its answer, it depends, whether *auro-chloride of sodium* be a true double salt or not; at all events, what is *sold as such* is not a double salt of gold and sodium, but *a mere mixture of the two chlorides;* and it becomes a question whether its excess of chloride of sodium does not destroy the effect that would be produced were a true double salt to be used, supposing such a double salt to have any *real* existence; but, "*when doctors disagree,*" especially when they are of eminence, as to what is to be considered as such, "*who is to decide?*"—Yours truly,

George Price.

P.S.—I may point to, at least, one obvious lesson suggested by these differences of opinion in high authorities, namely, the importance of avoiding dogmatism in dealing with such subjects. Some of those who assume to be authorities in the chemistry of photography are sadly in the habit of dogmatizing as to what chemistry teaches, and of sneering at experiments not conducted with strict regard to what are regarded as known chemical laws. But is it not a fact that many chemical laws have been discovered by accident or crude experiment, and that many received chemical laws have been overturned or modified by the revelations of photography? Did Daguerre discover the daguerreotype process by experiment or induction? Was alkaline development discovered by experiment or by the aid of *à priori* reasoning, and is its rationale now quite understood?

Photographic Notes and Queries.

The Photographic Exchange Club—Rain Water for Washing Dry Plates, &c.

Sir,—As this is just the time for enjoying the advantages of the Exchange Club, when out-door work is at a standstill, and amateurs have nothing to do but to print, I regret to see week after week passing away without anything being done. Could there be any objection to at once, without further loss of time, publishing the names of such members as may desire it so as to enable them to exchange with one another as before? only let it be understood that any one may "decline with thanks" an offered exchange, if for any reason disinclined to accept it; and as no one need send more than one print at first to an untried address till he sees whether exchanges in that quarter would be likely to suit him, no great disappointment need arise.

Is it necessary, or desirable, to use rain water throughout in preparing collodio-albumen plates? I generally wash first with rain, then thoroughly with spring water, and again slightly with rain before applying the albumen. I am anxious to perfect myself in this process, which I prefer to all others on account of its one great advantage, which I am surprised has not been more noticed in the innumerable discussions on the comparative merits of the dry processes; namely, the long (I suppose indefinite) time which the plates will keep after the first and chief preparation. I am now engaged, during the dark winter months, in preparing a stock of plates which I hope will last me all the summer, and none of which will be wasted, being sensitized only as required for immediate use; whereas those who spend perhaps fine summer days in preparing two or three dozen plates ready for use, must often be prevented by bad weather, illness, or some other cause, from using them till most of them are spoiled. I suppose even tannin plates could hardly be trusted to keep from this time till the end of next summer.—I remain Sir, yours, M. A. O.

[We shall have pleasure in again initiating the old system, and publishing a list of names, if those concerned desire it. A first and last wash with rain or distilled water are sufficient. The many good qualities of the collodio-albumen process, especially its certainty, and long keeping both in the first and completed stage, are generally well known. It is the greater simplicity of some other processes which recommends them.—Ed.]

Helensburgh, 30th January, 1864.

Talk in the Studio.

Tannin for Large Plates.—We have received from Mr. John Eastham, of Manchester, an exceedingly fine example of the value of tannin for large plates. The print is 18 inches by 16 inches, the subject being a fine old mansion, Manor Heath, the residence of Frank Crossley, at Halifax. The picture is exceedingly well lighted, and at once vigorous and full of detail. The deepest shadows are very transparent, and there is a complete absence of chalkiness in the lights. The printing is very fine. It forms one of a series entitled "British Architectural Gems." We have rarely seen so fine an architectural photograph, especially of so large a size and from a dry plate negative.

Java in the Magic Lantern.—Mr. Walter Woodbury, whose interesting account of a photographic ramble in Java appeared in our fifth volume, has recently issued a series of his choice tropical views for the magic lantern. Those of our readers who have given any attention to the subject are aware that very precise qualities somewhat difficult to attain are necessary in slides for the lantern. They must be soft and full of detail, and, at the same, free from the slightest deposit in the transparent parts; not dense, but still black in the deposit which forms the shadows. These qualities Mr. Woodbury has attained admirably. We have no information as to the method employed, but so far as we can judge they are produced on wet collodion, toned with mercury and ammonia. The result is very excellent. The subjects are charming, and the negatives evidently very perfect, indeed. Whether for instruction or amusement we cannot well conceive a more valuable series. Some of the scenes are exquisitely beautiful as pictures, foregrounds with gorgeous profusion of tropical foliage, added to fine river scenery and delicate distances, producing an effect which a poet or painter might imagine, but which we should scarcely hope to meet in a realistic transcript of natural scenery. The human interest of the series is enhanced by portraiture. Here is a very charming Javanese girl, sweet and pensive in expression, and graceful in pose, most admirably photographed. Mr. Woodbury has made the most of some years' residence in the island, in securing some of its most characteristic gems of every kind.

To Correspondents.

Enquirer.—The quantity of pyroxyline to be added in making collodion, depends much upon its quality. About from 4 to 6 grains will generally suffice. Col. Stuart Wortley has, we believe, used different samples. It is very probable that the collodion made by the formula in your note will answer the purpose; but you had better increase the proportion of alcohol to at least an equal amount with the ether. The lens you have will doubtless answer admirably. For large plates, a tent will answer better than a dark box. The presence of acetic acid will not prevent the application of Mr. Gage's method of rectifying the bath.

Servian Lepmas.—The chief point to observe in enlarging is to secure sufficient detail in the transparency. It will not need intensifying, but give it plenty of exposure. 2. In mounting stereographs, if they have been taken with a bi-lens camera, the prints must be cut and transposed, but it is not necessary if they are taken with a single lens camera. The space between the same point of each picture should be about 2¾ inches. Each side may be cut so as to contain exactly the same objects, but it is better to let the right-hand picture have a little more of the right side and the left a little more of the left side.

Cornish Enough.—It is very probable that leaving the collodion a longer time to subside will remedy the evil.

J. A. L. (Bath).—The triple will answer best. 2. We have no experience, but we should think so. 3. Moderately.

A Subscriber from the First.—The acetate bath may be used at the expiration of a couple of days, or will keep for many weeks. About a week is perhaps best. 2. It is very probable that a blind of tracing linen which will stop out direct rays without very much diminishing your light, will answer best.

Developer.—The condition of the collodion, and sometimes the bath being weak, are occasionally causes of the image being washed away when the developer is poured on. A new developer will have less tendency to cause it; but it is chiefly a question of manipulation, and may generally be avoided by the exercise of greater care when the tendency is most present.

D. C.—The equipment you propose will probably answer your purpose. A swing-back is intended to enable you to keep the plane of delineation or sensitive surface parallel with the object when the camera is tilted. It is necessary, for instance, at times to tilt the camera to get the top of a large building into the picture. But the effect of this tilting would be to make the lines of the building converge towards the top, unless a swing-back were used to keep the sensitive plate parallel to the building. The purpose of double backs is to carry a stock of dry plates conveniently. Each double back carries two plates. An instantaneous shutter is only used where instantaneous pictures are required.

Cheek.—If you could have had the north side glass, instead of the south, it would have improved your room. You will find the adoption of the screens we recommended very valuable in your case; but they must be moveable, so as to be placed in various positions, to cut off direct sunlight, and permit you to work at each end of your room.

R. G.—There is a little work on microscopic, published by Cox, of Skinner Street. See article in our next on Dagron's method.

J. S.—Unquestionably hypo stains. You may easily imitate them, and convince yourself, by touching sensitive paper with fingers contaminated with hypo

C. J. Sunnell.—There is not, we believe, any such list in existence.

An Amateur.—The difficulty to which you refer is a very common one, and may proceed from many causes. There are various remedies, of which the most certain is treating the film with a solution of iodine, before intensifying. You will find the subject fully treated on p. 361 of our 6th volume, and also in the photographic Year-Book, just issued

William Laird.—The collodion referred to was kept three years in the bromo-iodized state. 2. Your cloud scene is very good, but it is too heavily printed.

C. Y.—You have probably used new paper, and allowed it to remain too long on the albumen solution, the effect of which is a partial dissolving of the size, which produces the evils you describe. Leave the paper on a much shorter time—only a few seconds, instead of a minute.

A Foreigner.—We cannot very efficiently advise you in the case you describe. So far as we can judge from the examples sent, the negatives are very bad indeed. It is difficult to form any opinion of the quality of the printing when the negatives are bad; but, so far as we can judge, the printing is good. Can you not convince your principal of the true state of the case by appeal to your prints from good negatives? A good printer can, however, generally obtain employment. Should you fail in settling the matter to your satisfaction, let us have your address.

A Lady Amateur.—For the purpose of making your silver into nitrate, it should have been granulated by pouring into water whilst melted, as it will be a slow process to dissolve one solid ingot. You will find detailed instructions on p. 6 of our 5th volume. Should you not have it, we will give further hints.

Silver.—We cannot explain more of the method than we gave; but we can readily conceive its operation. Plate frames are the dark slides, which, although varnished, will, on soaking, imbibe a certain amount of moisture.

Studio.—The lens you mention will just be the thing to suit your purpose, and will just work in the space.

J. M.—The tones are very good. We prefer those on the *Save* paper.

W. S. B.—You may use your south light chiefly in dull weather. When the sun shines you may use a blind of tracing linen. It is probable that by this means you will find your lighting very efficient.

M. B. W.—In using the solar camera with an artificial light the reflector is, of course, dispensed with. The light is placed at a distance from the condenser of double its solar focus, and the condenser the same distance from the enlarging lens. You will find an article on the subject with diagram of the arrangement at p. 74, Photographic News, vol. v.

H. T.—If you require information as to the production of transparencies on dry plates by superposition. See Nos. 139, 140, and 208 of the Photographic News; if on wet collodion by camera printing, see No. 143, and also our Year-Book just issued.

Camera.—We are glad that our information met your case so successfully. It affords us some satisfaction to find a somewhat arduous portion of our duties so productive of useful results.

J. F. L.—A bad lens does not necessarily possess "depth of focus," but it may do so. It depends upon the nature of its imperfection, depth of focus will be the result of positive spherical aberration; if this defect exist to any extent it will destroy all definition. But negative spherical aberration will also destroy definition without giving depth of focus. Chromatic aberration will not give depth of focus, and a lens may be defective in various respects without possessing the quality to which you refer. The quality can be conferred by a judicious optician in a given degree without appreciably injuring definition. You cannot expect to get the right thing by accident in a bad lens; but it may be secured in a good lens by a judicious balance of corrections effected by any skilful optician.

Several correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already received	199	1	8
M. Voigtlander	15	0	0
Wm. Terry, Esq....	1	1	0
W. Bates, Esq.	0	10	6
P. S.	2	2	0
A. Goodchild, Esq.	0	7	6
Messrs. W. and D. Downey, Newcastle	1	1	0
T. Blackshaw, Esq., Burslem	0	5	0
Charles Collins, Esq., ...	0	5	0
Daniel Jones, Esq., Liverpool...	2	2	0
R. Hill, Esq., Oxford	2	2	0
Do., Assistants	0	10	0
Messrs. Johnson and Mathey	1	1	0
O. J. Jones, Esq.	0	5	0
Henry Harvey, Esq.	5	5	0
T. Miller, Esq.	0	5	0
E. Bentley, Esq.	1	1	0
H. Mather, Esq.	0	5	0
A. A., Esq., Market Drayton	1	0	0
F. B.	0	10	6
W. T. and R. Gowland, Esqrs., York	0	10	6
John Moffatt, Esq., Edinburgh	2	2	0
Messrs. Harvey, Reynolds, and Fowler, Leeds	3	3	0
	£239	15	8

Several contributions received during the week will be acknowledged in our next.

Photographs Registered during the Past Week.

Mr. Samuel Walters, 3, Falkner Crescent, Bootle, near Liverpool,
Photograph entitled the destruction of the *Lotty Sleigh*.

Mr. George Great Rex, 5, Clarendon Terrace, Southampton,
Photograph of Miss M. Cooper, as *Troubadour*, in "Lalla Rookh."
Photograph of Mdlle. Louisa Powell, as *Columbine*, in "Lalla Rookh."

Messrs. Elmslie, Franey, and Haddon, 43, Parliament Street, London,
Drawing in Water Colour of New Grammar School, &c., at Woodbridge, Suffolk.

Mr. William Fox, Sandbach,
Two Photographs of Rev. Marmaduke Miller.

Mr. H. P. Robinson, Leamington,
Photograph—Autumn, a Landscape and Figures.

The postage of the Photographic News Almanac to France, and other foreign parts, is 1s.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 284.—*February* 12, 1864.

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THE TWOPENNY PIRACIES.

PHOTOGRAPHIC portraitists have for some time past endured much annoyance, and some loss, from a petty nuisance in the shape of twopenny piracies of their works, which is not the less annoying because the copies are produced for, and by the direct sanction of, their original customers. We have repeatedly been asked, "Are there no means of preventing such piracies?" We fear there are no effectual means which are readily available for preventing this nuisance; but it is well worth the attention of professional portraitists to consider what steps may be taken to check the progress of an evil they cannot entirely prevent.

It would, of course, be quite competent to photographers to register every portrait they produce; but this would be attended with an amount of trouble and expense altogether intolerable. Further, as the copyright of a portrait does not necessarily become the property of the photographer, some steps would require to be taken before he could register it, and so secure the copyright. If the photographer enter into engagement with any one to sit to him for his own purposes, the copyright becomes his property, without transfer or agreement; but when one of the public sits to a photographer, commissioning him to execute a portrait or portraits, without entering into any especial stipulation as to copyright, in such case no copyright accrues to either the photographer or his sitter. But the photographer may acquire a copyright in the portrait he produces for a customer by special agreement in writing, a memorandum of which must be duly registered at Stationers' Hall.

If, then, the photographer could induce his sitters to sign a memorandum of agreement, forms for which might be kept on each leaf of a book intended to receive the instructions for the portrait and address of the sitter, then occasional copies of some of the most important portraits might be registered, and prosecutions undertaken in case of piracy. A few cases of this kind would place the pirates in such a state of uncertainty that they would probably shun the risk of piracy.

A photographer recently writes to suggest that one means of checking this practice might be adopted by hanging in the specimen room an original picture, and, side by side with it, a copy, showing to sitters the inevitable falling off in the copy, and thus aiding to deter them from being content with such imperfect results. Another photographer, an amateur, writes to us, informing us that he was induced, nearly three months ago, to respond to the advertisement of one of these "copying companies." He sent stamps for a specimen, and received it. He then sent up a card portrait, with the necessary amount in stamps to pay for the copies. From that day to this he has heard nothing more from them, neither receiving the ordered copies nor any answer to his further letters. The *Daily Telegraph* recently contained a letter on a parallel case. Here it is:—

CARTE DE VISITE PORTRAITS.

TO THE EDITOR OF THE "DAILY TELEGRAPH."

SIR,—Will you kindly allow me to ask, through your columns, whether anybody has ever got their portraits or money returned from those persons who advertise to take fifteen copies of cartes de visite for half-a-crown? Nearly three months ago I paid my money and left my portrait; but, in spite of twenty applications, I cannot get either returned.—I am, sir, yours, &c.,

Jan. 27. A LUNATIC.

We apprehend that wherever business is undertaken on unremunerative terms, such cases will be common. Possibly, if the portraitists who suffer most from those piracies were to take occasion to give some publicity to such, in their reception rooms, a salutary effect might be produced.

We do not here deprecate honest and fair competition in photography any more than in any other form of commercial enterprise; but we at all times condemn the cheapness which strikes a blow at the possibility of excellence, as that degrades the art and checks its progress. And we especially protest against that spurious and pretended cheapness which is incompatible with common honesty, either to the original portraitist who produced the picture which is copied, or to the foolish victim who is gulled into parting with his stamps for copies he will probably never receive. The first gentleman who attempted to carry out the cheap copying system, a very able but unscrupulous man, recently closed his efforts in that direction by becoming an absconding bankrupt. We trust the fate of his project may have a salutary effect on those who attempt to carry out similar foolish and impracticable schemes.

ENGLISH PHOTOGRAPHERS AND THE UNITED STATES SANITARY COMMISSION.

WE have received from Mr. Atkinson, of Liverpool, a note, calling our attention to a letter from Mr. Anthony, of New York, the purport of which we best explain by printing the letter itself. It is as follows:—

New York, Feb. 15, 1864.

DEAR SIR,—A great "Metropolitan Fair, for the United States Sanitary Commission," is to be held in the City of New York, on the 28th March.

I am appointed one of the committee to solicit contributions in the photographic line.

Will you have the kindness, in my name, to lay the matter before the photographic public and photographers in Great Britain?

The Sanitary Commission does what Government cannot do in looking after the health, &c., of the soldiers, and has saved thousands of lives. It is the "Good Samaritan" on a large scale.

Whatever contributions may be sent should leave Liverpool on or before the 5th March, and I have no doubt the American

and European Express Company will bring them over free of charge. All contributions will be properly acknowledged.—Yours very truly, E. ANTHONY.

We believe there will be but one opinion on the worthiness of the object which English photographers are here desired to aid. Whatever views may be held by our readers on the merits of the fearful conflict which has raged so long between two divisions of the great American nation, whether their sympathies incline to the cause of the north or south, every one must feel deeply for the individual sufferers in the terrible carnage; and a commission which undertakes to relieve them deserves the good wishes and aid of mankind at large. Englishmen and Americans do, moreover, belong to one family. The very bitterness of the outcry against England of late is really one of the strongest confessions of the relationship. Disappointed in not meeting with hearty fraternal sympathy in this war, they have expressed that disappointment with all the acrimony common in family quarrels. The present object is one in which the heartiest sympathy can have practical expression without any reference to the cause of war. England does not forget the generous action of America during the Irish famine, nor in reference to the distress in Lancashire, and we trust that English photographers will make a handsome response to the appeal of Mr. Anthony. Let them at once overhaul their stock of photographic treasures, and send freely of their best specimens. All contributions should reach Mr. Atkinson, 37, Manchester Street, Liverpool, with their object endorsed on the wrapper, before the end of the month. We hope for extensive and liberal contributions.

SILVER IN THE WHITES OF FIXED ALBUMENIZED PRINTS.

BY JOHN SPILLER, F.C.S.

IN the PHOTOGRAPHIC NEWS, of January 8th last, was inserted a letter from Mr. Henry Matheson, with the above heading, wherein your correspondent stated that he had been successful in removing entirely the traces of "free nitrate of silver," which are apt to linger in the protected white parts of prints upon albumenized paper. The method of proceeding recommended for the entire removal of the silver from those portions consists in treating the toned and washed prints with a dilute solution of iodide of potassium prior to fixing the same: this process is said to insure the formation of iodide of silver, which afterwards is capable of being dissolved out in a bath of hyposulphite of soda of a strength equivalent to five ounces to the pint of water.

I have repeated this experiment, and see no reason to contradict the assertion of Mr. Matheson, if his statement be merely intended to apply to the "free nitrate" retained by the prints in their early stages of preparation; but after toning in a gold bath, whether neutral or alkaline, it is difficult to conceive the existence of any silver in the form of *nitrate;* at any rate, it is not the silver in this state which constitutes our greatest obstacle, but rather that small proportion which always enters into chemical combination with the albumen, and is not afterwards soluble in hyposulphite of soda.

If, however, the author's remark was to be understood as applying to the removal of a practical difficulty, which has not hitherto been overcome, I must confess my inability to arrive at an equally satisfactory conclusion with himself. It has not been possible in my experiments to dissolve out the whole of the silver from the whites with the assistance of iodide of potassium as directed. In other words, I have proceeded exactly according to the author's instructions, and afterwards thoroughly washed the albumenized prints, but in all cases there remained sufficient silver in the whites to give a notable stain when moistened with dilute sulphide of ammonium. This statement is not based upon a single observation, but ten prints were treated by the same process, and in every one silver was detected; then the whole batch of ten prints were passed once more through a new solution of hyposulphite of soda, and again thoroughly washed. Still the silver was found obstinately remaining in combination with the albumen, and the test, applied as before, gave the same result.

It will be remembered that, when first directing attention to this practical difficulty, I made a statement* to the effect that iodide of potassium, *applied after fixing*, removed a small proportion of the insoluble organo-silver compound, but its use was not attended with that degree of success which compensated for the extra trouble and cost. The new mode of applying the iodide recently suggested by Mr. Matheson has not, in my hands, led to a better result, in evidence of which I send herewith one of the prints so treated.†

Chemical Department, Royal Arsenal, Woolwich, February 8, 1864.

THEORY OF THE COMPOSITION OF THE PHOTOGRAPHIC IMAGE.

BY M. EUGENE SAHLER.

THE following experiments to which I have been led by the theoretical hypothesis I published in May 1862, if repeated and commented upon by skilful theorists and practical operators, who have more leisure for experimenting than I have, may throw some light on the question of the formation of the photographic image, and also contribute to the progress of the art.

First Experiment.—I washed in several waters a plate collodioned and sensitized in the usual manner, so as to completely eliminate all excess of nitrate of silver; I then immersed the plate in a saturated and filtered solution of binoxide of barium.

During exposure in the camera I produced fumes of hydrochloric acid, to put the film of iodide of silver in contact with oxygenated water.

When the plate was withdrawn from the camera it exhibited the same opaline hue, without any trace of a picture. To develop it with sulphate of protoxide of iron, it was first washed, without which there would have been a precipitate of sulphate of barytes formed. The developing solution now poured over the plate did not change its colour, nor cause any image to appear.

After a fresh washing, I immersed the plate in the nitrate of silver bath, and at the end of a minute, I submitted it again to the action of the developer. The effect was immediate, the entire film became vigorously black, and the picture invisible as a transpareney, showed itself distinctly by reflected light.

Second Experiment.—To attenuate the effect of the oxygenated water, I operated as in the preceding experiment, by diluting the bath of binoxide of barium with water, and exposed the plate for twenty seconds, producing in the camera a disengagement of carbonic acid gas.

The plate washed and immersed in a bath of nitrate of silver, strength 3 per cent., gave a very distinct picture; the development was slightly extended over the whole plate.

In these two experiments, the film composed only of oxyiodide of silver did not change its aspect, and the developer by itself had no effect upon it. The striking analogy which this case presents to the ordinary reactions, appears to me to merit serious attention.

My conclusion is, that the disturbance caused by light is rather a chemical combination, and that in the production of the picture, there is a formation of oxyiodide of silver.

A well known chemical observation had already led me to adopt the hypothesis of oxidation; it is, that *chloride of silver treated, warm, with nitric acid, does not produce aqua*

* *Vide* PHOTOGRAPHIC NEWS, vol. vi. p. 470.

† The print received bears unmistakeable evidence of the presence of silver, in the characteristic stain produced by sulphide of ammonium. ED.

regia, like the other chlorides; for, as it does not abandon chloride in the presence of energetic oxydants, there can be no formation of oxychloride.

The results obtained in the dry process seem especially to confirm this opinion. What, in fact, are the substances that succeed the best?

1st. The resins and tannin bodies which slowly absorb oxygen, an absorption which facilitates the oxidation of the sensitive film.

2nd. Albumen which has an alkaline reaction, the alkalies and alkaline salts, which, in contact with the sensitive film form double salts more readily oxidizable, since even the water of the bath can decompose them by loss of oxygen, a reaction so well known in fact, that it causes alkaline baths to be rejected, as they fog the pictures.

Third Experiment.—I next poured upon the sensitized film a mixture of a small quantity of the saturated solution of binoxide of barium; the liquid did not become turbid. A rapid exposure, with an iron developer, gave me an excellent negative. In this case, also, the plate was washed after exposure, and then immersed in the nitrate bath.

It is to be remarked that the two oxydants that I have employed, chlorate of potassa in presence of nitric acid, and binoxide of barium, give so much solidity to the collodion film, that the varnishing may be suppressed.—*Revue Photographique.*

MICROSCOPIC PHOTOGRAPHY.

Traité de Photographie Microscopique, par M. Dagron. 18mo, pp. 36. *Paris*, 1864.

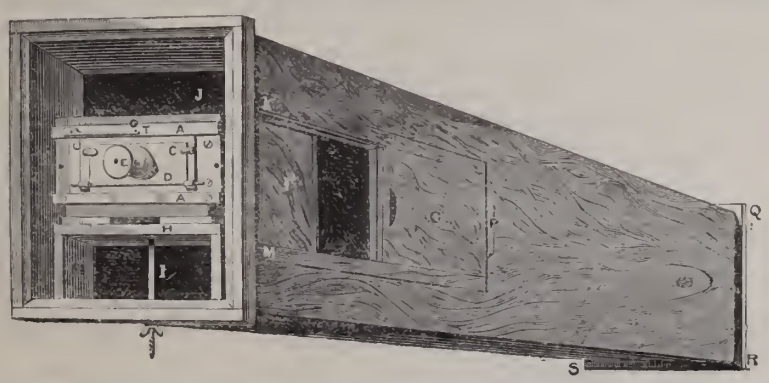
Among the more attractive features of the photographic section of the Great Exhibition of 1862, M. Dagron's Microscopic Photographs commanded by far the largest share of interest and admiration. The instrument was not too large to hang on the same ring with a watch key; it was among the smallest of "charms," and yet when looked through, it exhibited portraits, &c., as perfect as those of the largest size, and as easily recognised. So remarkably elegant was the getting up of these Stanhopes, as they have since been named, after the Stanhope lens, that M. Dagron has never encountered a rival in their manufacture, which would indeed, seem to demand the aid of fairy fingers. To gratify the curiosity that prevails respecting the means by which these microscopics are produced, the inventor has published the little treatise under notice. He says;—"That within the five years from whence the introduction of the Stanhope dates, this branch of the photographic art has become a considerable manufacture, requiring the aid of no less than thirty various accessory branches, principally those of jewellery. A Stanhope is a simple microscope formed by a vitreous mass, one extremity of which is ground as a biconvex lens, forming the eye piece, and the other a plane surface, is intended to receive the microscopic photograph which is placed in the focus of the lens. The microscopic proofs are obtained by means of the above apparatus:—

A. Wooden box or tube, about 14 inches in length.
B. Frame, in which the micrometer is placed, which serves for focussing, and for holding afterwards the prepared plate for receiving the microscopic proofs.
C. Brass plate moving on the axis D, and holding the glass plates.
E. Regulating microscope, serving to place the micrometer in focus. In the interior, and occupying a position opposite this microscope, the objective is placed, moving between two slides This objective and the microscope E advance and recede by the turning of a screw.
F. A spring, the pressure of which engages the point of the screw G, in the eight notches cut in the thickness of the upper part of the frame B.
H. Wooden platform supporting the whole of the above.
I. Screw fixing the tube upon the platform.
J J. Diaphragm concentrating all the light upon the objective.
K L M N. Lateral aperture in the tube, through which to introduce the hand into the interior to regulate the objective.
O. Shutter moving in the slides and closing the above aperture when the picture is focussed.
P. Stop for the shutter.
Q R S. Opposite extremity of the box upon which the negative and ground glass are placed.

The glass plates are cut 8-10ths of an inch by 3 inches, and will contain 8 portraits, 3, 6, 9, or even 15 objectives can be mounted and worked at once, but can only be required where a large manufacture is carried on.

To operate—the focussing is effected by looking through the microscope E, and turning the screw which acts upon it until the lines of the micrometer, placed in exactly the same position as the sensitized plate is to occupy, appear distinctly. Then the picture of the negative which has been placed at Q R, is brought to the focus of the objective by working the screw attached to it until the picture is clearly detached from the lines of the micrometer. It then only remains to replace the micrometer glass by the sensitized plate. The pictures may be obtained from negatives of every size, carte de visite, half plate, or whole plate; the negative is inserted at the extremity of the tube Q R, which is placed opposite a strong light, as an open window for instance. The luminous rays which pass through it are rendered convergent by an objective of short focus, depicting an infinitely small picture upon the prepared glass plate. The time of exposure of course varies with the state of the sky from 1 to 3 seconds, the process employed is Taupenot's.

When sufficiently exposed, the objective is advanced one notch, then a second, &c., until eight negatives are obtained on the plate. When the exposure is completed, the negatives are all developed at the same time, and cut by a diamond into small squares. The Stanhope lens is then placed for a few moments in a furnace heated to a gentle temperature, to melt the Canada balsam round its edges, which make the little square of glass bearing the photograph adhere to it.



DOUBLE PRINTING.

BY H. COOPER, JUN.*

It has been urged by some that printing is an almost mechanical operation, fit only to be left to subordinates, and quite unworthy of the artist's consideration.

* Read at the London Photographic Society, Feb. 2nd.

This idea is now, I hope, exploded; and I trust you will all join with me in declaring that as much taste, judgment and skill are required for successful and artistic printing as in the production of a negative. When we come to *double* printing, which is the subject of the following jottings, the demands upon taste, &c., become much more urgent and apparent. By *double printing* I do not wish you to understand the mere production of a medallion on a tinted ground, but when a print, upon removal from the negative, is improved by any after application of light, if I may be allowed to use the term. I will now proceed to describe, as briefly as possible, the method pursued in the production of the prints which I have exhibited at the last two or three meetings of this society, as, since writing on the subject, I have introduced some important improvements in the mode previously adopted.

I may here mention that nearly all the prints brought in illustration of this paper have been shown before; but as it was through them that I was induced to write the ensuing remarks, they will perhaps be most suitable for our purpose.

Imprimis, procure some *thin* photographic paper; salt, sensitize, and expose to light till thoroughly blackened. This is to form the masks. After a very long trial, I find this to be the best material that can be devised.

The black and orange papers sold by stationers will sometimes answer very well, but are, unfortunately, liable to pinholes, which admitting light, form black specks on the prints.

The first style that we shall consider is the vignette on a tinted ground. Print the vignette in the usual way.

Now, in the method recommended by Mr. Harmer and myself a year ago, a dab of cotton wool was employed to cover up the lights of the picture whilst tinting the margin. By this means very perfect results may be obtained by a skilled manipulator; but it requires such nice and delicate handling that, unless extraordinary care is used, a halo will be partially formed round the figure.

By the plan now used this ridiculous effect will, with a little care, be quite a rarity. The first thing needed is a board, quite level, covered with velvet or flannel. Take a piece of the paper directed to be blackened for masks, which has not been exposed to light, and upon it print a faint impression from the negative about to be used. With a pair of sharp scissors cut out the head and shoulders, supposing it to be a portrait, making it the *least* bit smaller than the print, so that it may not lap over and produce a light line on the side of the head; cut the lower part into jags or spikes; fasten it with a little gum-water to the centre of a sheet of glass, free from specks or air bubbles; and sun it till sufficiently dark to obstruct the chemical rays. On the *opposite* side of the glass, gum a small piece of cotton wool over the spikes of the mask, to more effectually soften them off.

The vignette being printed, place it upon the covered board; lay the piece of glass on which the mask is gummed over it, taking care that it is exactly in the right place, and expose to light till the required tint is gained. The use of the velvet or flannel on the board is to prevent the print from shifting when the glass is moved.

Attention has lately been called to a fact of which great use may be made.* I mean the curious circumstance that when a piece of photographic paper is exposed to the direct rays of the sun, the tone produced is much warmer than if it had been submitted to the action of a subdued light.

The discrepancy between the tones is preserved in all the after-processes. If we wish the flat tint to be colder than the picture, we must tint it in a weaker light than that to which the negative has been exposed, or *vice versâ*.

The production of a medallion on an india tint is conducted on much the same principle as the vignette. From the blackened paper cut an oval or other shaped mask, and affix it to the negative. The print produced will, of course, have a white margin; we have now to tint this.

Should the background not bear of being made darker without detriment to the picture, an oval mask must be used, as described last year. Some care will be required to prevent a line being formed on the side of the medallion. Where practicable, the method of tinting pursued with the vignette will produce a much finer effect. The background then, possessing a tint, as regards *colour*, very nearly the same as the margin, falls away as it were, causing the figure to assume a more life-like expression, it appearing to be almost stereoscopic.

In illustration, I have here an ordinary vignette-print from a negative by Mr. T. R. Williams, and a medallion, tinted in the way recommended. The difference is so striking, that I need hardly call your attention to it. In the one the flesh appears rather dirty, the effect of the high lights and delicate half-tones being destroyed by the surrounding mass of white; but in the other the roundness, brilliancy, and delicacy are remarkable, the lights appearing purer, and the shadows richer than in the vignette.

There is an almost endless variety of effects to be produced by means of masks, and I think that it must be apparent to all, that the means possessed of improving a print by introducing shades, &c., are very numerous, as well as greatly under control. As a single instance, this print,* when removed from the frame, was nearly worthless, the masses of white and black in the background throwing the figure quite into the shade, so that it appeared the photograph of some steps with an iron railing, with a figure that was quite a secondary consideration; but upon masking the figure, and subduing the surrounding objects, a very fair picture is produced.

I will not detain you with descriptions of means to produce twilight, sunset, and other effects. The only extra things needed for producing patterns on the flat tint are a sheet of tracing paper and a blacklead pencil; the design, being drawn in black, of course appears on the print as white, which must be subdued to the required tint.

To produce anything effective in this way requires a great deal of taste and tact. The simple flat tints will be found to be very easy of production, if a little care and attention be used. If you set about your work in a systematic manner, not nearly so much time as you would imagine is required.

The great secret of success is to bear in mind that nothing obtrusive must be introduced, as the end in view is to embellish and to set off to the best advantage prints obtained from moderately good negatives. You must not for one moment imagine that I have intimated that good prints may be got from a radically *bad negative* by doctoring; but that the best may frequently be improved, and that the good qualities in any negative may be brought prominently forward, whilst some of the defects are buried in the shade.

If I should have left any necessary details of manipulation unexplained, I shall be glad to answer any questions on the subject.

* See our article on p. 601, vol. vii.—Ed.

COLLODION: WET AND DRY.

BY M. L'ABBE' DESPRATS.

The title under which we have hitherto published our series of photographic studies will not be fully justified if we say nothing about dry collodion, properly so called. For some time past, particular attention has been directed to dry processes, and upon this important point of the new art communications follow one another very rapidly. Doubtless they have a certain value, the reception they meet with is a proof of it; we think, however, that upon this head all is not yet said, and on that account we consider it to be our duty to refer to what we said on this subject nearly eight years ago. Simple and sure as was the method we then made

* A sitting figure of a gipsy, with natural background.

known, we shall see that the new modifications we have brought to bear upon it render it both more simple and more sure.

First. We require to give as brief a summary as possible of what we have previously published. Our method has been described, it is true, in several treatises on photography, as well as in various periodicals, but most frequently in so summary a manner, that it is almost impossible to apply it properly.

The following is what we have indicated:—

Collodion with iodide of potassium, with which is mixed one-half of one per cent. of powdered rosin, which instantly dissolves.

Neutral nitrate of silver bath, strength four per cent.

Developer.—Pyrogallic acid with acetic acid, according to the usual formulæ.

Such are the chemical products. The various manipulations are as follows:—

The glass plate on removal from the sensitizing bath, and drained for a minute, is immersed under a depth of two *centimètres* (eight-tenths of an inch) of distilled or rain water. The plate is lightly rocked until the collodion has lost its greasy aspect; the water is then renewed, and the plate is left in it for a quarter of an hour or more, it is then withdrawn, and washed on both sides in a stream of pure water, and resting on one corner the plate is left to dry spontaneously in a dark place. If time is precious, the plate may be dried by artificial heat, after being well drained. The plate may now be exposed in the camera; *the time will be as short as with wet collodion.*

The next thing is to develop the picture. The plate is first immersed in pure water, and the bubbles adhering to the surface must be carefully removed by blowing upon them if they persist whilst the plate remains in the water. The plate must remain at least ten minutes in the water, in which the collodion film becomes softened, and recovers a little of its permeability, then the plate is sensitized a second time in the nitrate bath (four per cent. strength), drained, and lastly submitted to the action of the developer, poured into a flat dish, into which the plate is put, collodion downwards.

This, in brief, is what we indicated eight years ago. It has been recognized that we were the first to suggest the employment of rosin in collodion. No one previously had done more than to show the necessity of modifying the action of the developer, combined with a second sensitizing, as we still do.

Is there at the present time anything to be deducted from these suggestions? Absolutely nothing, and we have the conviction that in following them strictly to the letter, the results we promised will be attained. But if we must maintain what we have said in principle, it will be equally our duty to indicate now the important modifications practice has suggested to us. These modifications bear neither upon the collodion nor upon the sensitizing bath, nor even upon the developer; the chemical part of the process remains just the same. The manipulation only is slightly changed, but we believe very beneficially.

First, let us refer to an extremely important observation, which is, that the washings in water must be prolonged in proportion to the tenacious texture of the collodion. For this reason, a collodion highly charged with alcohol, and consequently less tenacious, appears to us preferable, if, at the time of the picture appearing, the washing is imperfect. In that case the plate becomes black in places, especially in those where the collodion is thickest. The plate, perfectly freed from nitrate of silver by several methodical washings, is dried, as stated above. After removal from the camera, at the expiration of a time, more or less long, the dried plates may be kept in good condition several days, although we are of the same opinion as Dr. Van Monckhoven, who advises their being used as soon as possible. We usually prepare them the day before use. It is an operation very easily performed in the evening, as may be the bringing out the picture.

This is assuredly the most delicate part of the process. Very easy with certain collodions, especially old, and those charged with alcohol; with others, and worked as we have recommended it should be, failure will sometimes take place. The picture will sometimes come out irregularly and imperfectly—besides, the developing goes on very slowly, and the collodion film, teased too much, finally breaks. These are serious inconveniences, but they may in most cases be obviated.

Primarily, with the view of bringing the dry plate into the same condition as the wet, we have recommended the softening of the collodion film in distilled water, before submitting it to the second sensitizing. At the present time, to attain the same end, we submit the film to the combined action of diluted alcohol (half water), and pure water afterwards. Holding the plate by one corner, we pour the dilute alcohol over it, in the same manner as collodion, and pour off the excess. The film is instantly penetrated by the liquid, which result may be recognized by its becoming transparent; it is then washed in pure water until it loses its greasy aspect, then drained; it is then placed on a tripod, and covered with a *new bath* of nitrate of silver, of 2 per cent. strength. It is submitted to its action for at least two minutes, the nitrate is then poured off into a bottle, and the plate left to drain for a minute or so.

On the other hand, we pour into a flat dish some of the pyrogallic developing solution, to the depth of an inch or so. Holding the plate vertically, the collodion towards the liquid, it is steadily lowered by means of a hook. In a few seconds the picture will begin to appear; at this moment we replace the plate on the tripod, and well cover it with the developing solution to finish bringing out the picture. The action is a little slower than by the wet process, but quite as regular and complete. If necessary, the picture may be intensified as usual. Very often it will be advantageous to do so, seeing the small quantity of silver contained in the second sensitizing bath.

In making this application of the alcohol diluted with water, which we must regard as very important, everything comes out not only with astonishing regularity, but the film, also, being thenceforth softened equally throughout its substance, becomes less friable, and resists better the subsequent washings. On this occasion, we may add that this final resistance of the film is not alike in all collodions. Those sensitized with iodide of potassium resist better than those with cadmium. The drying of the film over a charcoal fire also imparts more solidity. Lastly, the means of making the film adhere to the plate by the application of several kinds of varnish to the edges are well known; for our own part we think that their use may be dispensed with by a little care.

If we reflect a little upon the various manipulations described, it will be easy to see that they all tend to bring the dry plate to the condition of the wet, and we may conclude that in attaining this aim, we shall also obtain the same results as the wet method gives. We venture to assert, without fear of contradiction, that experience has led us to that consummation, so that the photographer, who, by means of wet collodion, can obtain instantaneous pictures, may equally obtain them by employing dry collodion with rosin, provided, however, that he follows scrupulously the instructions laid down. For, if we do not deceive ourselves, the method we have published, although simple in its elements, is, nevertheless, complex in practice. If rosin is necessary as a preserving agent, one thing is perhaps still more so, either for operating quickly or well, and that is the method of developing we have described. The process we publish cannot be judged fairly unless it be followed in all its features.

We shall conclude by saying that any collodion, it appears to us, may be employed by the dry way with the previous addition of rosin. We should, however, add, that hitherto we have iodized our collodion with iodide of potassium and cadmium only, either separate or mixed.

Lastly, if experience suggests any modification likely to prove advantageous, we regard it as a duty to make it known, as we considered it was one not to postpone any longer the completion of what we had already published on this subject. It was possible to greatly extend this communication, which certainly admits of greater development; but we have thought that for the present it would be better to limit it to this short explanation to render it clear and precise. As it is, it may be considered too long; but we could only have made it shorter at the risk of being imperfect.—*Le Moniteur de la Photographie.*

ALCOHOL AND ITS ORIGIN,

Being Short Lesson in Photography.—No. 20.*

Alcohol is a member of a large and well-defined family, the direct offspring of the starch and sugar family.

Organic compounds consist essentially of combinations of carbon, hydrogen, oxygen, and nitrogen of different proportions, either of all of them or of part of them.

Other elements that exist in organic bodies may be regarded, in many instances, as accidentals; they are not always necessary parts in the composition; such are potassa, soda, lime, magnesia, oxides of iron, chlorine, fluorine, sulphur, phosphorus, bromine, and silica.

But organic compounds are more numerous than inorganic compounds; and the earth and its atmosphere, that is, the complete orb as it gravitates with all its appendages, both animal, vegetable, and inorganic, vitalized and dead, consist of an aggregation of organic and inorganic compounds. Hence, it becomes an easy deduction to say that organic bodies must owe their diversity mainly to the difference in the *number of equivalents* of the organic elements in their composition. But this diversity does not depend entirely upon the difference in the number of atoms combined, but upon a difference, probably, of the *grouping* of those atoms; for *isomeric*† compounds in this department of chemistry are not rare; thus, sugar of milk consists of $C_{24}H_{24}O_{24}$, that is, 24 equivalents of charcoal and 24 equivalents of water, or 144 parts of charcoal + 216 parts of water.

We deduce, furthermore, that, since the number of equivalents of an organic compound is great, its stability will be less; and that, consequently, slight causes will produce changes in the composition, and frequently destroy it. Perhaps we have arrived at this conclusion, *a posteriori;* for we know by experiment that apparently slight causes convert cane-sugar into grape-sugar or glucose, and the latter into alcohol, and this into acetic acid; that milk, beer, wine, cider, &c., become sour in a thunder-storm; that the venereal disease and small-pox are easily engendered in previously healthy blood by the slightest quantity of the corresponding poison, the diastase of the malady.

From such examples we probably have drawn our conclusions, that organic bodies in general are unstable, and easily pass into other congeneric forms, as links in the propagation of organic matter.

Thus, then, in various plants (beginning with organized bodies) exist starch in its slightly distinct granules and sugar (the molasses as it were of starch). These bodies belong to the same family; and the former can be converted into the latter by oxidizement or something similar to this process.

Starch exists in the seeds of all the cerealia, that is, in barley, wheat, oats, rye, corn, in the seeds of the different grasses, in acorns, pumpkins, horse-chestnuts, potatoes, and various other roots, in mosses, fruits, &c. The granule of starch is in the form of a very minute egg, consisting of a shell and its contents; the shell is different in shape and markings in the different seeds, fruits and roots; so that the microscopist can frequently designate the origin of starch from its granule. This granule is very minute, and will easily pass through the meshes of a fine cambric filter when mixed with cold water, in which it is insoluble.

When the granules are boiled the shells burst, and give an opaline appearance to the water; and the contents are let out and dissolved, giving rise to gelatinous starch or amidine. The composition of starch is $C_{24}\ H_{20}\ O_{20}$.

* From *Humphrey's Journal.*

† Compounds consisting of the same number of equivalents and of the same elements, and yet differing in every other respect.

Dextrine is an artificial preparation of starch obtained by boiling the latter in a small quantity of dilute acid, such as sulphuric acid; the starch soon becomes thin and limpid, and resembles gum. The sulphuric acid undergoes no change, but it produces a change; it is separated by adding chalk in powder as long as there is any effervescence, and then filtering. The clear gummy liquid is dextrine. It has the same equivalent as starch. By evaporation to dryness it resembles gum.

By boiling starch for a longer time, and in a larger quantity of acid, it is converted into *grape-sugar*, that granular substance which is found on raisins, or on the covers of preserves, or in honey. The same operation of conversion of starch into sugar is produced by *diastase*, and at a much lower temperature. This latter substance is found or formed in the gluten or albumenous matter of seeds when in the act of germinating, or in buds when developing. To obtain this substance barley is first malted. When malted it contains both starch and diastase, which, in solution at 160°, soon give rise to grape-sugar.

Cane-sugar is found in the sugar-cane, in beet-root, and in the sap of the maple and other trees. It is a juice which crystallizes after due evaporation. The mother-liquor, or that part which refuses to crystallize, is called *molasses.* Its equivalent is $C_{24}\ H_{22}\ O_{22}$. It is converted into grape-sugar by means of some nitrogenous substance undergoing putrefaction, or capable of it when exposed to warm air and moisture, as, for instance, blood, the white of egg, flour paste, or yeast from the fermentation of beer.

Grape-sugar consists of $C_{24}\ H_{28}\ O_{28}$. It is obtained from the juice of certain fruits and plants. It may be regarded as the secretion of plants. The general name for sugar obtained from fruits, flowers (honey), and from the conversion of cane-sugar, and of starch, is denominated *glucose.*

Liver-sugar, mannite, diabetic sugar, are all allied to grape-sugar. Gums, such as *gum arabic, gum tragacanth,* as also the fibre of cotton and the fibre of linen called *cellulose* and *lignin* belong to this family. They can all, more or less, be converted into grape-sugar or glucose. Linen and cotton rags may be made to yield more than their weight of grape-sugar. Now, this grape-sugar or glucose is itself also a very unstable body, and is easily converted into other forms. By this conversion it gives rise to a *second generation* or family. The instability of this compound, and the facility with which it changes or becomes decomposed, may be compared to a billiard ball on an inclined plane, prevented from descending by a few impeding pebbles. The removal of one of these, or a slight push, from whatever cause will give it motion. So with glucose in solution. The addition of a minute portion of putrescent matter in warm weather will immediately institute a change, which, progressing finally, produces the

Alcohol Family.

A very respectable family this. It dates its origin far back to the time of the flood. For in Genesis it is recorded that "Noah planted a vineyard; and he drank of the wine and was drunken." Homer mentions this family and their doings in his day.

Alcohol, then, is the child of grain, fruit and root: of sugar and starch. Starch is first converted into sugar, and then sugar into alcohol.

The act of this latter conversion is called fermentation, which is produced by means already mentioned. This species of fermentation is denominated the

Vinous Fermentation.

The expressed juice of grapes, apples, pears, &c., when exposed to the air in a moderately warm place, soon begins to ferment, which is manifested by the evolution of a gas, an increase of temperature, and a general disturbance throughout the whole solution. This fermentation is supposed to be brought about by the albumenous matter which the juice contains, and which it has received from the fruits, aided by a temperature of about 70°. How this operation is commenced, we may as well confess at once, we know not.

A solution of pure sugar does not undergo this fermentative change; it requires some putrescent azotid substance to give it a start. A little yeast is the best material to effect this purpose.

Yeast is regarded by the microscopist as a plant, which is seen to grow as it were, whilst you look at it in the microscope, and consists of little transparent corpuscles adhering together, and forming clusters or branches. To the naked eye it is a

grayish-yellow soft solid, which does not easily dissolve in water, and becomes light brown by drying. When moistened and warmed it soon begins to grow putrescent, or *to grow*, in fact, and thus to induce a similar change in saccharine solutions, or, at least, a sort of fermentation that gives rise to a large growth of the same plant (if there is, besides, an abundance of albumenous substance in these solutions), as well as to a decomposition of the sugar into glucose, and of the latter into alcohol and carbonic acid. It is thus seen that the same sort of ferment is required in the first place to convert the syrup of cane-sugar into glucose, as to convert the solution of the latter into alcohol and carbonic acid. On this account it may happen, and frequently does happen, that the whole of the ferment is expended on the first operation; so that the product of such a fermentation will be simply a solution of syrup, or, as it is sometimes denominated, a *sweet wine*, which, in fact, may be no wine at all; for, by the word wine is meant the result of the second fermentation, which consists in the conversion of the solution of glucose or dextrine into alcohol and carbonic acid.

The preparation of beer, that is, the conversion of the amylaceous materials in barley into alcohol, is an exceedingly interesting lesson in this department of science. The starch already exists in the grain of barley, wheat, rye, Indian corn, oats, &c., but contains not an iota of alcohol, nor is it as yet in a condition to be transformed directly into vinous spirit. Now, let all these different varieties of grain be placed in a condition of warmth and moisture, so as to cause them to sprout or germinate, they will then have changed in constitution, the starch will have become converted into glucose, and the peculiar substance called diastase will also have been formed out of the gluten, probably, by the same process of germination. As soon as the sprouts have attained a proper degree of growth, the latter is cut short by a process called *kiln drying*.

If a solution be next made of the kiln-dried grain, it will be found to be sweet—it is a saccharine solution which contains also the peculiar aroma or oil, and the colouring matter of the grain, together with a quantity of diastase, which assists in converting whatever part of the starch has not been changed by the germinative process, into glucose or grape sugar. This solution, obtained by the aid of heat from malted grain, is called *wort*.

The wort is next boiled with a sufficient quantity of hops, if it is intended to prepare beer, ale, or porter out of it—the infusion of hops communicates an agreeable bitter taste to it, and prevents it, after it has undergone the vinous fermentation, from entering at once into other changes which give rise to another well-established family.

As soon as the wort, thus tempered with hops, has cooled down to a proper temperature, it is mixed with a proper quantity of yeast, which almost immediately institutes the vinous fermentation, whereby the glucose becomes alcohol and carbonic acid; and the yeast has increased very considerably in quantity.

Where alcohol is the object in view, the hops are omitted, but the diastase or ferment is added to the saccharine wash; and the fermentation is continued until the whole of the glucose has been completely decomposed. To do this requires an accurate knowledge of the quantity of sugar in the wash, and the requisite percentage of yeast to be employed. The acquirement of this knowledge has been the cause of a much larger production of vinous spirit in a given quantity of grain than was formerly obtained.

The grain, which has thus subserved the purpose of the saccharine conversion, and the subsequent vinous fermentation, contains still a considerable proportion of food for hogs and cows; it has been deprived, however, of certain very important elements of food, such as probably gluten and vegetable albumen, whose deficiency may be the cause of the great prevalence of *pneumonia* in hogs whose food consists essentially of such refuse. The public undoubtedly are unacquainted with this curious fact, that hogs in distilleries feed for a number of weeks and grow fat on such swill, and then, all at once, droop, become paralyzed, and die suddenly. They are, however, not allowed to die a natural death; the proprietor simplifies the matter, and has them slaughtered by the score to anticipate nature; and then—what? Guess the rest.

"What has all this to do with photography?" you say; "Wait with patience for the next lesson," is our say. "Adieu!"

HOW TO PRODUCE LIFE-SIZE PHOTOGRAPHS.*

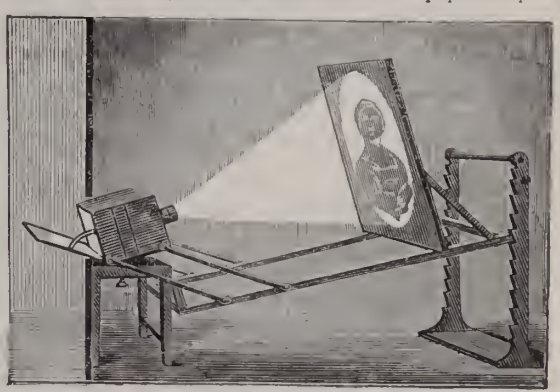
Contrasting two large pictures, the one being obtained by the use of a large lens, and the other by a process of magnifying through a small negative, few artists would fail to award the latter the palm for natural truth and pictorial beauty. In this country the use of the solar camera, as the instrument for obtaining life-size, or very much larger, photographic images, is called, is in its infancy; but on the Continent, owing chiefly, perhaps, to reasons upon which we shall have presently to to touch, it is more popular with the profession, and much more largely used.

For painters the instrument is peculiarly useful, although they have not yet, perhaps, recognized the fact. To *pose*, light, and group nude or draped figures, obtain a negative therefrom, and then throw the magnified image from this negative upon the canvas, requires comparatively little time, and many effects may be so obtained and tried, before the artist finally takes his charcoal and goes over the outlines and shadows of the optical image to transfer it rapidly and permanently to his canvas, thus securing a fidelity to Nature, and an accuracy of drawing, which would otherwise be the result of days of laborious work and patient study from living models.†

We propose, in the following short paper, to describe the solar camera, and the process of using it, giving the chemical formula adopted by Mr. Sydney Smith, certainly one of the most successful, and perhaps the most experienced solar-camera operator we have.

The instrument is very readily and simply described, being little more than an ordinary photographic camera, fitted up in front with a lens of, say 4½-inch focal length, supplied at the back with a small mirror and condenser, and fitted up internally with grooves, &c., in which to place the negative, by aid of a small door opening at the side. The camera is used in a darkened room, the back being exposed to the light outside the window through a hole in the shutter, or similar arrangement, and the lens pointed towards a kind of easel on which the canvas, if you intend to trace, or a sheet of paper to form a focussing screen, if you mean to print, has been smoothly and flatly placed. The image of the sun being received on the mirror—moved to the required angle by the provided means—is caught by the condenser and transmitted through the negative and lens on to the focussing-screen, canvas, lithographic stone, photographically sensitized paper, or whatever else may have been prepared for its reception. The mirror must be at an angle which will place its focus exactly on the centre of the enlarging lens.

Suppose photographing is your object, the image is focussed with the rackwork of the camera, and, when it is in focus, or perfect, the lens is covered with the cap, or the negative with the yellow glass, and the sensitized paper is put in



position. If you adopt that process of developing, a very faintly impressed image only will be required, which can be attained in about 12 seconds during the summer, and in about 40 seconds during the winter; but, if you require an image

* Condensed from the *Art-Student*.

† Some painters argue against everything that renders their art less difficult in practice, as a source of degradation, as if the great merit of a work of art resided, not in the intellect and genius embodied, but in the labour bestowed; not in the effect obtained, but in the means of obtaining it. It may be more difficult to execute a picture in charred wood, with a hot poker, than to paint one with good pigments and a well-made brush; but who will assert this as a reason why a picture obtained by the latter process is inferior to that by the former?

printed right out, as in the ordinary printing process, the exposure will be from one to three or four hours. The first process is the more simple and certain—the last the more hazardous and uncertain; but, with reference to results, the latter, perhaps, has the advantage.

In London, very little solar-camera work can be done during the winter, but by virtue of an arrangement of which we give a sketch, Mr. Smith contrives to work on days in which all his fellow operators are necessarily idle. This arrangement will be at once apparent on inspecting our above-given sketch. The screw below the stand on which the camera stands will tilt it to any required angle, and the wires which attach the camera to the parallel bars, in the grooves of which the frame for receiving the paper moves, are at once raised to a corresponding angle, thus sloping the surface, which receives the picture, to a position parallel with that of the camera. The stand with blocks on the parallel and perpendicular bars serves to keep the whole steady and firm.

At times of the year when the solar camera is usually put aside as useless, it may still be applied, and to good purpose, by virtue of this new plan of Mr. Sidney Smith's, as, whatever the position of the sun, its image may generally be obtained *on the centre* of the condenser.

We now give the mode of operating, with regard to printing by development, which we regard as the best process.

1. Of the negative required.—This is *all important*, and a really artistic picture, with transparent shadows and perfect gradations from light to dark, cannot be obtained without a good negative—good, not in the sense in which a negative for ordinary use in the printing frame is good, but peculiarly in reference to solar-camera productions. This negative should be, in every part, more or less transparent or thin—it cannot be too thin—and should be a slightly over-exposed negative, such as, in the pressure or printing frame, would give a weak flat image, without sufficient contrast. From this negative we can get an enlarged picture, having the whole of the details and half-tints well registered in the lighted portions, and without that red cast over the burnt-up shadows, which indicates over-printing, or that greenish cast over the imperfectly-registered half-tints, on the lighted portions, indicative of under-printing. For taking this negative on, select a piece of thin, pure, white plate glass, entirely free from flaws, bubbles, scratches, or other defects. Coat it with a bromo-iodized collodion, which should give a smoothly even film, free from either a crapy appearance, or other defects arising from floating particles of dust,* and which, although seemingly unimportant, become glaringly conspicuous when magnified. When coated, the plate must be sensitized in a weak silver bath, about 30 grains to the ounce, well exposed in the camera, and developed with sulphate of iron, 15 drops; spirits of wine, 15 drops; and the same quantity of glacial acetic acid.† After developing until every scrap of detail is secured, wash, and fix, and dry in the usual way, but do not varnish the plate, as it must be used without undergoing that process.

2. We next come to the paper. We have found none better than Hollingsworth's. It is to be kept carefully clean, handled carefully, and salted by immersion in a bath made as follows, in which it should remain until thoroughly saturated:—

Bromide of potassium	...	...	...	7½ grains.
Chloride of ammonium	...	...	...	4½ „
Gelatine	...	...	...	3 „
Water	...	...	...	1 ounce.

It is next sensitized in a solution of nitrate of silver, 60 grains to each ounce of water, which may be brushed carefully over the surface with a piece of clean Canton cotton.

3. Our next business is with the exposure to the negative. While yet damp, the paper is fastened *smoothly* and *flatly* on the stretching frame, or rather board, on which the image has been previously focussed, as above explained. The sun being out, and the reflecting mirror properly arranged, the lens may then be uncovered, and the process of exposure commenced. A faint and barely visible impression, such as will be obtained from a tolerably good negative, in about 12 or 15 seconds in the warm summer weather, and in 30 or 40 seconds in winter, will suffice. When the negative is not sufficiently thin, or proportionately transparent in every part, a more strongly printed image is required for development, and the exposure must therefore be lengthened. In the print such a negative is recognized by the reddish colour of the deeper shadows, and the greenish colour of the fainter half-tints.

4. The developing follows next in order of description. Without exposing to daylight (of course), the exposed paper is taken down, and the edges turned up, so as to form a dish, the image being upwards. Into this dish, a saturated solution of gallic acid is so poured, that it sweeps *at once* over the whole surface. To this it is best, in summer, to add a little acetic acid (a few drops), but in winter it is not necessary. Should any portion of the paper have escaped the siver solution when it was sensitized, red insensitive patches will now reveal them. During development, the deeper shadows darken most rapidly, and the more delicate tints come last. The developer must be kept in continual motion, and for this purpose a tuft of swan's down calico may be used. The process will generally occupy from 15 to 30 minutes, according to the temperature of the room. If the negative has not chanced to be a suitable one, long before the details are all developed or visible on the illuminated side of the image, the shadows will be undergoing a process of destruction (losing their gradations, reflections, and details), and whatever plan you adopt, an imperfect, inartistic proof must be the result.

5. Fixing. When the image is well developed, the gallic acid is *thoroughly* washed away with a plentiful supply of clean water, care being devoted to the thoroughness of this washing, because, otherwise, stains will be produced of a very unpleasant character. This done, a solution of hyposulphite of soda, about five ounces to a quart of water, is used to fix the image, after which it is well washed away, and the operations are complete.

6. Printing without development. In this case the image remains on the printing board for hours, instead of seconds or minutes, and additional care and labour becomes necessary. The mirror requires more attention, the circle of light longer and more careful watching, while there is danger of the image losing its sharpness and force through the paper beginning to dry, and, therefore, to contract. In this case the exposure is continued till the print is not only out with all the strength and details the negative can give, but is slightly over-printed. It is then treated just as a print in the ordinary way would be. The best pictures produced in this way are Mr. Stuart's, of Glasgow, whose formula we append.

Toning Bath.

Acetate of soda	...	...	...	7 ounces.
Distilled water	...	...	...	80 „
Chloride of gold	...	...	...	15 grains.

Fixing Bath.

Hyposulphite of soda	...	...	...	6 ounces.
Water	...	...	...	20 „

7. Printing enlarged negatives. This is the more rapid and certain, but also the most expensive and troublesome of the solar camera's applications. The coating of such huge plates with collodion, and the evenly developing of them being no easy task. The process is to get a transparency on glass from the negative, and use this in lieu of the latter, so as to obtain a negative, instead of a print, of the required size. This negative can be used in the usual way, in a huge printing frame, and any number of proofs can be readily, cheaply, and easily obtained. The camera, too, may be used at any time, and in the absence of the sun, the exposure being only one of a few seconds. The electric and oxy-hydrogen light have been successfully used with the solar camera. R. A. S.

* For which reason dust is to be most carefully avoided through the whole of the operations necessary for taking the negative.

† It is hardly necessary to inform the operator that, once sensitized, the paper must not be again exposed to light, until it receives the image.

ON A METHOD OF INSTANTANEOUS ENGRAVING ON METAL.

BY MONSIEUR E. VIAL, OF PARIS.*

A great number of processes have been at various times proposed as substitutes both for engraving in relief upon wood and also as aids to plate engraving. The ordinary process of engraving upon wood, as well as the plate engraving, requires long and costly work; and both processes are merely reproductions of the drawings of artists, the difficult interpretation of

* Read at a meeting of the Society of Arts, Feb. 3, and reported in their Journal.

whose ideas is a constant stumbling-block to the engraver, whilst the final result obtained is always more or less a combination of the ideas of the artist, and those of the engraver.

To engrave a drawing directly upon the plate without the intervention, or (so to speak) the interpretation of the engraver, is, then, of unquestionable utility, both for the purposes of relief and intaglio engraving. In the numerous trials which have been made upon this subject, in order to obtain the necessary depth in the engraving, recourse has almost always been had to acids, or to voltaic electricity, but it is evident that with this method of operating, the metal is acted upon, at the same time, both in a lateral and a vertical direction, and hence the result has been more or less imperfect and unsatisfactory.

The new processes which I have the honour to submit to the Society of Arts this evening, are based (excepting the first) upon electro-chemical phenomena, without the aid of an ordinary galvanic battery, the effect of which is a clean, deep, and non-lateral biting. They have been protected by letters patent in this country, and in France, and form the subject of a paper which I presented on the 15th of March, 1863, to the Imperial Institute of France, a commission appointed by which, has reported favourably on my communication, and conveyed to me the thanks of the Institute for it.

I will now briefly describe the fundamental principles of my processes, together with the different manipulations and the industrial applications which result therefrom.

I may state, firstly, that the principle of my discovery is but the application of a scientific fact long since known, which is, that if we plunge a piece of one kind of metal (say steel, for instance), into a saline solution of a metal of an opposite nature (such as copper), the solution is immediately decomposed, and the metal reduced is precipitated upon the former, frequently with a considerable amount of adhesion. Such is my starting point, and without taking upon myself the scientific explanation of the phenomona, I shall confine myself merely to the description thereof.

The first process which I shall describe, depends—

1st. Upon metallic precipitations.

2nd. Upon the relative affinity of acids for different metals.

It consists, firstly, of making a drawing upon paper with a metallic ink, composed, for example, of a solution of sulphate of copper; and I may add, *en passant*, that a solution of the salt of any other metal, such as lead, bismuth, mercury, silver, &c., would produce the same effect, according to the metal desired to be engraved. When the drawing has been thus made, it is placed face downwards, upon a plate of zinc or steel, and next covered at the back with a piece of cloth slightly damped, and the whole is then submitted to a uniform pressure. About two minutes afterwards, the design will be found transferred entirely, and with the greatest faithfulness, on to the metal plate, without any alteration or deterioration whatever of the original drawing. If, instead of making the drawing upon paper, it is made more simply still, upon the metal itself (whether zinc or steel), with this metallic ink, the same phenomena are produced. In this state, in either the one case or the other, the design appears on the surface of the plate in slight relief formed by the deposit of copper, a solid and resisting body

But in order to obtain a sufficient degree of relief for printing purposes, and more especially for surface printing, it is necessary to employ corrosion by acids or voltaic electricity, and this constitutes the second phase of the process. In fact, the acids, having a less degree of affinity for the copper than for the zinc, immediately attack the latter, whilst the former serves as a kind of protecting varnish to the lines.

I regard this process more from a scientific than an industrial point of view; for, having been very much occupied with carrying out my other processes, I have been forced to neglect this one; but I may add that it appears to me particularly applicable to the engraving of lace and other fabrics, which would only require to be impregnated with a solution of copper, to be transferred to the zinc, and then be engraved in relief.

I now come to my second process, or reproduction of old engravings. I employ two methods; the first, which I will call process A, depends—

Firstly, upon the antipathy of water for fatty bodies.

Secondly, as the preceding, upon the metallic precipitations, and the affinities of acids.

In fact, ordinary printing ink is greasy, and water, instead of having any attraction for it, is, on the contrary, repelled.

If, then, we place an engraving so as to float evenly with its back or wrong side upon a metallic solution, the aqueous liquid penetrates the paper slowly by imbibition, only around or between the lines formed of the greasy ink. After removing the proof from the bath, it is wiped lightly, and placed with its face upon a plate of zinc, and a uniform pressure applied. The metallic salt of the solution is immediately decomposed, reduced, and precipitated on to the plate, which it covers all over with its metal (excepting where the lines of greasy ink occur), in such a manner as to give a negative image in relief, representing with the greatest exactitude the design or engraving which has served to produce it. A few moments are sufficient to produce this result; even photography does not operate with more promptitude and fidelity. Negative proofs may at once be taken from the plate by the ordinary printing process, which proofs, by repeating the process, will produce positive plates of zinc. Or the positive plates may be made by at once attacking the zinc, covered with the negative image, by means of a voltaic battery, or in a bath containing 10 per cent. of nitric acid. The metallic solutions which I at first employed upon zinc were formed with salts of lead, copper, or bismuth, but the chloride of gold has latterly yielded me the best results; this is readily explained, on the one hand, by the facility of reduction which the salts of gold possess, and on the other hand, by the resistance which this metal offers to the attack of the acids. The solution is composed of about 2 parts of chloride of gold to 100 parts of distilled water.

This first method possesses the great advantage that it does not injure the original proof, which may thus be used an indefinite number of times, all that is necessary to remove the metal which is reduced on its surface, being to plunge it first into acidulated water, which dissolves the metal, and then into ordinary water, which removes all traces of the acid.

Guided by analogy, I have proceeded from these experiments to others, and it may not be without interest to speak of some of them, and to add that engravings may be transferred on to metals by impregnating them with alkaline solutions of chlorides, sulphurets, bromides, and iodides, and then applying them as above, on plates of pure or silvered copper, which will then present, according to the heat to which they are submitted in drying them, images in iridiscent colours of a very beautiful effect, with a slight relief caused, when operating upon plates silvered by means of mercury, by the volatilization of the latter metal by the heat.

This process of the reproduction of proofs by imbibition may be extended still further, and applied to engraving upon glass, and to printing woven fabrics. In the first case, it suffices to impregnate the back of the engraving with hydrofluoric acid, and to apply it with its face upon the sheets of glass, which at once become dulled, and then engraved by the corrosive influence of the acid. In the second case, I propose to employ the chemical phenomena, known by the name of double decompositions, and the following is the method of operating. The engraving is to be impregnated, as above, with pyrogallic acid, or with a mordant capable of re-acting upon a fabric previously impregnated with sulphate of iron, or otherwise suitably dyed, and then applied with a uniform pressure upon the stuff. The engraving may in this way be transferred to the fabric in a few minutes.

The phenomena are very simple; the pyrogallic acid transforms the sulphate of iron on the fabric into black pyrogallate of iron, and the mordant decolorizes, or fixes the dye of the fabric in all the white parts of the proof. The number of impressions which may thus be obtained is almost unlimited; the original engraving, after being washed, will serve as many times as may be desired

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, February 10th, 1864.

M. Davanne, in a letter addressed to the Editor of *Le Moniteur de la Photographie*, denies the statement made by Dr. Vogel, to the effect that he had abandoned his theory of the formation of the photographic image, nor can he imagine what it is that gave rise to this mistake, unless it be that

extracts from other authors quoted by M. Davanne, in the *Repertoire de Chimie*, have been taken as his own personal views. So far from M. Davanne having abandoned his theory, his experiments, both old and new, and the comparison of facts and analogies, render evident, in his opinion, the *chemical* action of light in all the circumstances where a thousand contradictory observers admit only a *physical* action. This question will be found discussed anew in M. Davanne's forthcoming new edition of his *Chimie Photographique.*

A photographic society has been established at Berlin, through the exertions of Dr. Vogel, the eminent chemist. Its committee has decided upon opening an exhibition of photographs during the coming spring. The numerous marks of sympathy which have contributed to the rapid formation of the Prussian Photographic Society are a strong manifestation in favour of the undoubted influence that photography now exercises upon the progress of art and industry.

Mr. A. Ken, in his "*Dissertations Historiques, Artistiques et Scientifiques sur la Photographie,*" asks the question: "Is photography an art? and replies affirmatively in the following terms:—

"In the infancy of the photographic art, its adepts, absorbed in experiments and researches, groping their way, and, moreover, dazzled by the rapidity with which important discoveries succeeded each other, had no time to consider the purely artistic side of the question.

"Nowadays, practical methods are established; they have become public property; they can be worked by every one, whatever his condition. The time arrived when research became concentrated upon the purely scientific and artistic phases of this great discovery. Then appeared lithophotography, heliography, heliochromy and photo-sculpture, links in the chain which now attaches photography to the industrial arts."

Photography is an art only when in the hands of an artist. In the art of painting we have painters (daubers), who assume the rank of artists, without any better claim to that title than that of working with artists' tools. The artist must make use of mechanical aids and appliances in order to develop his art, and make it evident and palpable to the sight; it matters little whether he handles the camera and lens, the pencil or the chisel, his work, inspired by genius will be artistic, and the process, whichever it may happen to be—painting, sculpture or photography—is in his hands an art. There seems to be a great deal of vague floundering in print in determining what is art, and what is science; can we do better than at once set down science as the principles upon which art depends and by which it works, proceeding in a straight and definite path? An art without science, the science upon which it should be based, is like a ship at sea without chart or compass. Painting, sculpture, and architecture are all based upon strict scientific principles, yet it is not presumptuous to say that many artists have lived long lives, and gone to their graves without ever becoming fully acquainted with these principles. They have worked out their genius in spite of their ignorance; how much greater they would have become had they made themselves better acquainted with the foundations upon which their art was based, we may readily imagine by inspection of the productions of Leonardo or of Michael Angelo, men deeply versed in the science of their day. Therefore, we may conclude it is not the art that creates the artist, but the artist who creates the art.

The eminent chemist, Henry Rose, whose work on "Chemical Analysis" has for many years been a text-book for students, died at Berlin on the 28th ult., after a long and painful sickness. He had just revised a new edition of his "Analysis."

As nitrate of soda engages much attention at present among photographers, it may be useful to point out the remarkable irregularity of its solubility at different temperatures; at freezing point water dissolves about 71 per cent. of fused nitrate of soda; at 50° F. it dissolves 78·57 per cent., at 67° about 88 per cent., and increasing in solubility with increase of temperature, until at 212°, water dissolves 178·18 per cent., and at 247° it dissolves 213·43 per cent.

SIR J. F. W. HERSCHEL'S CYANOTYPE PROCESSES.—A RECLAMATION.

Sir,—Observing in your number of this morning (No. 283, p. 67) a process for obtaining proofs in "Turnbull's blue," communicated by Professor Schwartz, of Breslau, which consists in washing paper over with a mixed solution of perchloride of iron, red prussiate of potassa, and oxalate of ammonia, in certain stated proportions, exposing moist under a negative to light, and fixing by simple washing in water—

Permit me to remark that, with the sole difference of the addition of oxalate of ammonia (which is not essential, *as the process succeeds without it*), this process is identical with that described in my paper "On the Action of the Solar Spectrum on Vegetable Colours, and on some New Photographic Processes," printed in the Transactions of the Royal Society for 1842, p. 202, § 205.

I am not sorry to have an opportunity of recalling attention to this very remarkable process, in which (as is there shown) the action *not only extends over the whole range of the luminous spectrum, but also down to the very extremity of the thermic spectrum*, exhibiting *before* fixing, in their highest perfection, those singular insulated spots in that spectrum which I have shown to exist at a very great distance below the extreme red rays, and *after* that process a continued blue streak, extending from the extreme violet to the places of two of those spots, of which it exhibits also images—a range of photographic action of which no other example has been adduced. I will venture to hope that this may induce some of your readers to re-examine this, and some other of my "cyanotype" processes; and in general to resume the use of the prism in studying the action of the several rays—too much, I am sorry to say, neglected of late.

I may take this opportunity also to mention that a process lately described in *Galignani's Messenger*, and attributed to Dr. Monckhoven, in which a solution of ammonio-*peroxalate* of iron is used to wash over paper, the image being brought out by nitrate of silver, differs only from the processes described in § 218 of the paper above cited (in which the ammonio-percitrate and ammonio-pertartrates of iron were used); by the substitution of the oxalic for the citric and tartaric acids, which, from the habitudes of that acid in general, might have been predicted. The production of a dormant picture, by the joint use of nitrate of silver and ferro-tartaric acid dried on paper, susceptible of development into a powerful negative by simply breathing on it, which I described at the meeting of the British Association, in 1843 (and which will be found described in the *Athenæum*, No. 829, p. 847), affords another and a very pleasing illustration of the use of these ferruginous combinations with vegetable acids.—I remain, sir, your obedient servant, J. F. W. Herschel.

Coltingwood, February 7, 1864.

Photographic Notes and Queries.

Alkaline Tannin—Nitrate of Soda, &c.

Dear Sir,—In last week's News, I read an account of an alkaline tannin process, giving very sensitive plates, which is in fact an easy way of alkaline development for that process. I hope it will be tested by those who have opportunity, as I feel convinced that (provided an alkali can be associated with tannin without decomposition), it will be found far easier and uniform in result, than alkaline development on plain tannin; from the description of the sensitiveness it appears about on a par with the alkaline gelatine formula, which, by the way, is rather

wrongly dealt with in Mr. Hughes' Manual, (Experimental Researches on Various Dry Processes, by Mr. Cooper), he merely soaked the plates in a solution of salt and carbonate of soda, then washing them, and applying the gelatine solution, his results must have been as they were, viz., no increase in sensitiveness; for, having washed away the soda with the salt (which latter ingredient, of course, must be eliminated), he reduces the plate to the old gelatine formula of Norris; had he allowed soda to be present in the dried film, the sensitiveness would have been vastly increased.

Permit me to recommend the use of nitrate of potass, in place of nitrate of soda, in the paper bath; when a difficulty arises in procuring the nitrate of soda in purity, I have always used it with good results, and it may be obtained everywhere, the commercial article merely causing a precipitate of chloride of silver which can be filtered out.—I am, dear sir, yours faithfully,

Wm. Bartholomew.

Egham, February 8th, 1864.

The Effect of Hot Water on Prints.

My Dear Sir,—I beg to enclose two halves of a photographic print of which × has been treated with scalding hot water after fixing and washing. The paper is ——— Rive, fixed ten to fifteen minutes in 20 per cent. fresh hypo bath. Not intending to keep this print, I, perhaps, did not bestow sufficient pain in washing, which may account for the yellow tinge of the whites and the stains on the back of the half treated with hot water. The results, however, viz., great deterioration of tone, are the same in all cases, and my usual practice is to wash 8 hours in at least 15 or 20 thorough changes of water.

On immersion in hot water, there is an offensive smell given off by the size, and the tone at once changes to a dirty yellow brown, which, however, improves a good deal on drying. Will you kindly inform me in your next, 1st, whether good paper should be expected to stand the test of hot water; 2nd, of the general practice among professionals in this matter.—I am, sir, your constant reader, W. A. S.

Feb. 8, 1864.

[We have frequently found that the finished print was slightly redder after immersion in hot water than before. But the example forwarded by our correspondent is changed from a rich purple black to a dingy brown, whilst the pure pearly whites have become yellow. We conceive that it is probable the result produced by hot water would have come in time without, the heat merely anticipating a decomposition which would inevitably take place. It is probable that the hypo-sulphite solution was old or acid, and that some traces remaining in the print, the heat produced a decomposition which liberated sulphur. We shall be glad to hear the experiences of some of our readers on the action of boiling water.—Ed].

Talk in the Studio.

Payment at the Time of Sitting Desirable.—An action was brought, on Thursday, at the Salford Court of Record, before Mr. Kay, to recover the value (£22) of two portraits, coloured photographs of the defendant, taken by Mr. Eastham. Mr. Edwards appeared for the plaintiff, and Mr. Torr and Mr. Cottingham for the defendant. The plaintiff is the well known photographer in Manchester. In 1861 a young and attractive-looking Englishwoman called upon him to have her portrait taken, giving the name of the Countess Peneflores. She was exceedingly anxious about the portraits, and called several times during their progress to suggest alterations, &c. When the pictures were finished they were sent by her orders to Messrs. Bolingaro to be framed, and were, according to Mr. Eastham, to be called for there by the defendant. When the portraits had remained at Messrs. Bolingaro's for several weeks, no one calling, they were returned to Mr. Eastham, who, failing to find the Countess, let the matter rest till December last, when a lady, with a young child, called upon him for the portrait of the latter. The portraits that had been taken three years before were hanging in Mr. Eastham's studio, and the lady, looking at them, said in a low voice to her maid, who was with her, "Do you know that? It is very like; the dog appears to know it." Mr. Eastham happened to overhear this remark, and his attention being called to the lady, he saw in her the quondam Countess de Peneflores, and the original of the portraits. He asked her if it was not so, and this she strenuously denied. Mr. Eastham made inquiries concerning her, and learnt that she had passed under a variety of names (Emma Normanby, among the rest), and was now living near Cheadle, under the name of the Countess Trenifiadi. The portraits were sent to the address of the lady passing under the latter name, who repudiated them. The defence set up was that there were two ladies, Emma Normanby and Countess Peneflores being one, and who had personated the present defendant on several occasions. A photograph of the Countess Trenifiadi was exhibited, which it was alleged was that of a very different person from Emma Normanby; but the jury found that they were one and the same person, and found a verdict for the plaintiff.—*Manchester Examiner.*

Fry *v.* Birnstingl.—The action brought by Mr. Samuel Fry, to recover from Mr. Birnstingl the price of a number of instantaneous negatives, and which, at the last Surrey assizes at Croydon, issued in a verdict for the plaintiff, has again come under the attention of the Court of Common Pleas. The defendant having applied for a new trial, obtained a rule *nisi*, and, on Thursday last, the plaintiff's counsel showed cause against it. The decision of the court was that the rule be made absolute on condition that the defendant paid into Court, within seven days, all expenses up to the present time. The action will, in case the defendant comply with this condition, be again tried at the next Surrey assizes.

New Carbon Process.—We have just received, at the moment of going to press, from Mr. J. W. Swan, of Newcastle-on-Tyne, some of the most perfect carbon prints we have yet seen by any process. They possess all the delicacy of gradation of a silver print, are very vigorous, and excellent in colour. We understand that the process is equally applicable to photo-engraving and block printing, as to carbon prints. We shall have more to say on the subject in our next.

Photography at a Fancy Ball.—At a recent fancy ball, in Paris, given by the Minister of Foreign Affairs and Madame Drouyn de Lhuys, attended by more than 900 persons, in splendidly picturesque costumes, and including the *elite* of Parisian society, one lady (name unknown) personified Photography, being covered from head to foot with portraits, and wearing the camera as a head-dress.

Photographs for the Magic Lantern.—Mr. Samuel Highley has just issued a new catalogue of potographic transparencies for the magic lantern, announcing a large number of seasonable novelties, including a series of subjects associated with the memory of Shakespeare, appropriate to the approaching tercentenary celebration. The catalogue also contains a list of apparatus connected with the electric and lime lights, and their application to photographic purposes, and details of Mr. Highley's arrangements for public and private lectures and demonstrations. We commend the catalogue to the attention of those interested.

Weak Printing Baths.—In a recent conversation with Mr. England, on weak printing baths, he informed us that, acting upon a suggestion by Mr. Mayall (see our Year-Book), he had recently tried increasing the strength of his printing bath, both with his ordinary paper and a more highly salted sample. He found an unquestionable increase in rapidity, which in dull weather in an establishment which produces from 1,000 to 2,000 prints daily, was a consideration; but in quality there was no improvement whatever. On the whole, the prints produced with a 40-grain bath were best, possessing equal richness and vigour and greater delicacy and transparency than those produced by stronger solutions. For general practical purposes he, therefore, preferred that standard. Mr. F. Eliot (of the firm of Sedgfield and Eliot), who exhibited a number of very fine prints at the last meeting of the Photographic Society, confirmed this experience. In their establishment they always adhered to the 40-grain bath in bright weather. In dull weather they used a greater strength to see which secured greater rapidity of printing and toning, but not better prints. They use Lampray's albumenized paper, which is prepared with about 8 grains of salt to the ounce. Mr. England uses alcohol in the silver bath, one part in eight. Mr. Eliot also uses it, but about one part in twenty. A "Photographer's Assistant" has recently sent us some prints with a 20-grain bath and 10 grains of nitrate of soda, which leave nothing to desire.

Photographic Society of Berlin.—We understand that the projected Photographic Society, which we stated a short time back was to be formed at Berlin, is now fully established, and has held two meetings. Dr. Jajor and MM. Luck, Juhre, and Voight contributed specimens of various kinds. M. Remelé

communicated some observations on the process of Sellbach and Mr. J. W. Osborne described the purpose of the costly lens now constructing by Mr. Dallmeyer for the Government of Melbourne. It is contemplated to open an exhibition about Whitsuntide.

CALCINED BORAX.—Mr. Hart suggests that where any difficulty is experienced in obtaining calcined borax for use with his method of reducing chloride of silver, photographers may prepare what they require as follows:—Pound the ordinary borax and place in a clean iron pan or porcelain dish: hold over a clear fire till it ceases to swell; when cold it may be powdered by the fingers if properly prepared.

To Correspondents.

HENRY.—It is impossible to photograph on the lithographic stone direct, but the best processes are those in which the photographic image is transferred to the stone from paper. The various processes have been described in our pages. If you have not access to back volumes, and will let us know particulars of what you require, we can inform you what back numbers will contain the necessary information.

A PHOTOGRAPHER, Brighton.—We cannot tell you the charges for advertisements in French photographic papers. The simplest way will be to communicate with them direct.

S. L. COLEMAN sends us a couple of prints to illustrate the working of weak baths. The negative was rendered sensitive in a 20-grain bath, and the paper on a 30-grain bath. The prints are as vigorous as if the solutions had been twice the strength.

WANGER.—We cannot tell you. He does not reside in town.

J. M.—The triple lens you name is an excellent instrument for general purposes, such as landscape, copying, and occasional portraiture in a good light, but it is not so rapid for portraiture as a portrait lens. Your camera would answer the purpose. 2. Doubtful: we should prefer the other. 3. We have seen some very fair results with it.

PERSEVERANCE.—The picture is brilliant and clean. It is not, however, quite sharp, probably from some movement of the child's head. Your light is a little too general and diffused, giving a tendency to flatness. Verify the name you have signed, and improvement will certainly follow.

A. E. P.—The *Art-Student* is published at 25, Paternoster Row, price sixpence, and issued monthly.

H. and AN AMATEUR.—The proceedings of these companies for perpetrating cheap piracies are very annoying. They may be checked somewhat, perhaps, but we fear there are no means of effectually stopping their operations. Such schemes cannot pay, and must collapse in time.

B. D.—We cannot speak with absolute certainty, not knowing all the circumstances of the case; but we should think that having the consent of the family to whom the painted portrait belongs, you might make copies with perfect safety and propriety.

A PUPIL OF THE NEWS.—In all preservative processes, acetic acid is recommended in the nitrate bath in preference to nitric acid, as the latter is apt to decompose the organic substances used as preservatives. There are several you may try, such as the honey process, the oxymel process, the raspberry syrup process, &c. It is probable that the malt process will answer your purpose.

F. VINCENT.—The arrangement you propose will probably answer for printing by development; but the lime light and enlarging camera must be enclosed so that no light can reach the sensitive paper, but what passes through the negative. You will, of course, remove the lens from the magic lantern. We cannot tell you the exact actinic relation of the lime light to the sun.

J. W. P.—Your plan will, doubtless, answer very well in fine weather. It will, however, have the disadvantage of not protecting the sitter effectually from wind or cold. The length of the screens we proposed will depend entirely on the length of the room, or rather on the extent of the side light.

J. SOTHERT.—We are obliged by your communication. We do not, however think at present of opening a "Poet's Corner."

H. ELPHINSTONE.—You will find the addresses of various firms who reduce photographers' residues in our advertising columns. We cannot with propriety mention any especial one here. 2. A grey tone is only obtained by long toning. The print must, however, be from a very vigorous negative, and the toning bath in good condition, to give a grey tone without impoverishment. A lime toning bath is most useful in obtaining warm greys and blacks.

T. M. G.—However perfect your lens may be, it is possible to get bad definition if you use it improperly. For a standing figure, the lens should be opposite the chest. If it be placed higher, justice will not be done to the lower part of the figure; if lower, an undignified view of the face will be obtained. 2. He does not stand highest, but has a reputation for good instruments. See that your camera is true. We have known a good lens condemned in consequence of being tried with a camera quite out of truth. 3. The specimen sent is under-exposed, and over-intensified. The tone is too black.

G. L.—Strong baths unquestionably tend to give vigour, and with negatives wanting in contrast, we should use a strong bath and print in the shade. But for clean good negatives, and with paper not heavily salted, experience has shown that good results may be obtained with a bath of 30 or 40 grains. The theory is not ours. We merely record the fact.

CHARON.—We shall make a few remarks on the subject, and recommend another trial of the old system, with certain modifications, in our next.

T. B. HUTTON.—Received. The subject shall receive attention in our next.

BAD COLLODION.—The collodion to which you refer we have found to be uniformly good, as suitable for winter as summer. We do not quite understand what you mean by a piece of black card in front of the lens. Do you mean a stop made of card? If so, it will improve definition; but will, of course, increase the time of exposure. So far as we can understand by your description, your lens will answer for card pictures.

T. R.—Probably No. 3 or 4. 2. We prefer No. 1. 3. Yes: quicker, because it gives good definition with a larger stop. We do not see any superiority in the last-mentioned.

THOMAS COLLINS.—Yes: because the lenses have an increase of diameter proportionate to the increased length of focus. Of the two, we prefer it where there is space enough.

W. J. C.—Unless you need to cut away too much of the middle, or at times are unable to get sufficient of the sides in, you need not alter the position of the lenses. But if you experience these difficulties, there will be no impropriety in cutting away portions of the flanges. The usual distance is 3¾ inches from centre to centre. We prefer them to have about an inch of sliding space for lateral adjustment.

X. Y. Z.—Your lens does not appear suitable for card portraiture; it appears to have a very short focus. 2. The reason of the dark corners in No. 2 is probably the position of the stop. You state that it is in front of the lens; if it be too far from the lens it will cut off the field and cause dark corners. 3. When you washed your prints in spring water, it would, of course, become turbid by formation of insoluble salts of silver, caused by the chlorides and carbonates in the water. We cannot say with certainty the reason why the prints toned so imperfectly. The fault was doubtless in the bath, but without knowing more of its constitution we cannot say in what. 4. Your light reaches the sitter from a front top light. It is too much in front and too much at the top.

REVIEWS of "The Silver Sunbeam," "The Universal Text-Book of Photography," "The Photographic Year-Book," "Fancies on the Photograph," "A New System of English Stenography," &c., are compelled to stand over until our next.

Several correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already received	239	15	8
R. R.	0	10	0
Messrs. M'Lean and Haes, London	2	2	0
Mr. Barrows, Liverpool...	0	5	0
— Hadfield, „ ...	0	5	0
— Shaw, „ ...	0	2	6
Charles Southwell, Esq., London	0	5	0
H. Petschler, Esq., Manchester	2	2	0
C. and G., London ...	1	1	0
C. I. Breese, Esq., Birmingham	1	1	0
A. L. Henderson, Esq., London	1	1	0
G. H. Murray, Esq. ...	0	2	6
Charlotte Phillips ...	0	2	6
Samuel Cooper, Esq. ...	0	2	6
Johnson & Sons, London	1	1	0
J. Davis, Esq.	1	1	0
Alfred Keene, Esq., Leamington...	1	1	0
James Elliott, Esq. ...	0	10	6
T. R. Williams's Assistants, 2nd Donation ...	1	3	0
Captain Higgenson ...	0	5	0
Chas Alfieri, Esq., Hanley	0	10	0
W. Walker and Sons, London	2	2	0
	£256	11	2

	£	s.	d.
Brought forward ...	256	11	2
Messrs. Tuck and Wilcoxson	0	10	0
Rev. T. B. Bannister, Liverpool	0	10	6
Mr. Unsworth, Liverpool	0	10	6
— Charters, Ryde ...	1	1	0
— Curtis „ ...	0	2	6
— Salter „ ...	0	2	6
Rev. E. Probert	0	5	0
Thomas Ayers, Esq., Yarmouth	0	10	6
A. E. P., Breuchley ...	0	5	0
J. P., Oxford	0	4	0
Collected by Mr. Ponting—			
T. C. Ponting, Esq., Bristol	2	2	0
W. F. Morgan, Esq. ...	1	1	0
J. H. M.	1	1	0
J. Beattie, Esq., ...	0	10	6
W. Holborn, Esq. ..	0	10	6
Mr. Seed	0	10	0
Joseph Whitworth, Esq., Manchester	5	0	0
Huggon and Co., Leeds...	3	3	0
T. H.	0	2	6
Major Russell, Romford	2	0	0
A. H., Ryde	0	5	0
C. M. Drayson, Esq., Canterbury	0	10	6
J. W. Fall, Esq., Ironbridge	0	10	6
	£277	19	8

Photographs Registered during the Past Week.

MESSRS. PRESTON AND POOLE, Penzance, Cornwall,
Two Photographs of the late Archibald C. Ross Carne, Esq.

MR. JOHN FREW, Railway Terrace, North Shields,
Photograph of the Rev. P. Sankey,
Photograph of Mrs. Cox.

MR. JAMES LAING, Castle Street, Shrewsbury,
Two Photographs of J. W. Clement, Esq., M.D., &c, Mayor of Shrewsbury.
Two Photographs of H. Robertson, Esq., M.P.
Two Photographs of Mrs. Wightman, Author of "Haste to the Rescue," &c.

MESSRS. MOIRA AND HAIGH, 1, Lower Seymour Street, Portman Square,
Photograph of the late Rev. W. Goodwin, of Norwich.

MR. ALONZO GAYLARD GRANT, Long Row, Nottingham,
Photograph of S. B. Wild, Esq.

MESSRS. J. AND E. OWEN, Bridge Street, Newtown, N. Wales,
Photograph of Tyn-y-rhos Railway Bridge.
Photograph of the Twymyn, from Tyn-y-rhos Railway Bridge.
Photograph of Talerddig Railway Cutting.

MR. W. H. WARNER, Ross, Herefordshire,
Photograph—Crosier Arch, and Remains of the Abbey of Strata Florida.
Photograph — The Crosier Arch, Abbey of Strata Florida, Ponthydfendigaid.
Photograph—Hafod Church, "Johne's Monument, by Chantrey," Mid-Wales Series.

MR. M. BOAK, Driffield, Yorkshire,
Photograph of Rev. W. Gleadill, in North American Indian Costume.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 285. *February* 19, 1864.

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A NEW CARBON PROCESS.

We have to announce to our readers the completion of a new carbon process, which will, we believe, possess every condition, and meet every requirement, hitherto laid down as necessary to the solution of the problem of perfectly successful permanent printing, conditions and requirements hitherto only met in part, or in promise. We have seen very fine results by M. Fargier's process, but we are informed by a very high authority in Paris, that the manipulatory difficulties are so great that it is not regarded as a practical process. Mr. Pouncy's printing ink process possesses many elements of very great promise. The prints by it have much excellence, and promise of more. They possess perfect gradation of tone, but it has been urged against them that in colour, at least, they are not equal to good silver prints. There are also some practical difficulties, such as the necessity of long exposure, &c. We hope to see that process make further progress, and take a permanent and valuable position; but at present it must be admitted that it leaves something to desire*. We have not seen any examples of the process recently described by Mr. Blair, of Perth, before the Photographic Society of Scotland, but we observe that the chairman, whilst describing the specimens as very perfect, added that there was still a want of delicate middle tints.

The specimens before us, by the process of Mr. J. W. Swan, of Newcastle-on-Tyne, are introduced to us very modestly, as not by any means free from imperfection, but as illustrating that the process contains the germs of complete success. We had known for some months past that Mr. Swan, who is an accomplished chemist, was working in this direction with considerable promise of success; but he was desirous that no public mention should be made of the matter until he was able to show tangible proofs of his success. These prints resemble in all points of excellence very fine silver prints, from which it is difficult to distinguish them. They possess perfect gradation of half-tone, without granulation of any kind, are very brilliant, extremely delicate, and have a peculiar effect of roundness and relief. In colour, there is nothing to desire, as it can be varied at will, the specimens before us ranging in tone from the pure black of carbon to the rich mixture of sepia and purple seen in good silver prints, the variation in tone being due to various tints mixed with the carbon. The lights are quite pure, and the blacks rich and vigorous. There is a peculiar delicacy in the gradation of tint which rather resembles the effect of a transferred collodion positive than anything else we know. The surface of the prints is exactly similar to that of albumenized paper, but we are inclined to believe that the surface is due to a film of collodion.

With regard to the process, we are not in a position at present to lay any practical details before our readers, beyond stating that a chromic salt, gelatine, and carbon are used. Judging from the uniformity of excellence in the prints before us, we conclude that the process is a certain one. It is much more rapid in printing than albumenized paper, the best of the prints before us only requiring seven minutes' exposure to sunlight. We have reason to hope, however, that very shortly we may be able to lay full details before our readers.

So far, we have spoken of what we have seen; but we understand from Mr. Swan that the same process which produces the prints before us, possesses the elements of what is of still greater economic importance, a very perfect method of photo-engraving, an example of which we hope shortly to be able to place before our readers. As to the promise of this process, we prefer to let Mr. Swan himself, and venture, therefore, to make some extracts from the interesting letter which accompanies our specimens. He says:—

With respect to photographic engraving, I think I may venture to say that I have the means of doing all that M. Disderi, in a recent article in your journal, claims to be able to do.

For months past I have had reliefs exactly like those of M. Placet, referred to in a recent letter of M. Lacan. I had done all that M. Placet proposes months before his process was published, and a good deal more than he proposes (I mean as regards chromo-gelatine; I have not worked with bitumen.) I can, for instance, get microscopic detail, which he says is difficult to obtain in gelatine; and any degree of relief from very low, such as you see in the carbon prints before pressing, and which the pressing has not quite effaced, to a roundness that is ample for both intaglio and relief printing. M. Placet's process—at least, so far as it was published—only refers to engraving from *line originals:* his process is quite competent to that, and mine also; but I have aimed at reproducing, for intaglio printing, photographs from an original, whether lined or not, and the results of my experiments are such as, I think, entitle me to assert that I have discovered the means of doing all that M. Disderi claims for M. Girard's process — photographic engraving from line originals, either for *intaglio* or for *block printing*. Also photographic engraving for *intaglio printing*, from photographs with no lines, but only gradation of colour, or light and shade, are all of them most positively accomplished facts.

It is a result that I have been longing for, and speculating how to obtain, for the last 20 years.

If the engravings approach in excellence to the carbon prints before us, it will be difficult to over-rate the value of the process. Our French correspondent recently intimated his conviction that the photographic millennium was at hand, and proceeded to quote the letter in which M. Disderi, referring to the process of MM. Girard and Co., announces, with so much circumstance, that photographic engraving is at length discovered. We hope it is. Photographers have become accustomed to announcements in

* Since writing the above, we have received from Mr. Pouncy one of his transferred prints, which proves by its excellence that Mr. Pouncy is making the progress for which we express a hope.

which the wish has been father to the thought. A perfect carbon process, and a perfect photo-engraving process, have been so desirable and so desired, that sanguine and enthusiastic experimentalists have often been tempted into a premature cry of *Eureka!* In describing Mr. Swan's carbon prints, we have been careful to keep within the mark of praise. Very able and fastidious photographers, to whom we have shown them, have pronounced them *perfect*.

If Mr. Swan's description of his success in the engraving process be as much understated as his estimate of his carbon prints, we may anticipate that it is a genuine success.

WEAK PRINTING BATHS AND NITRATE OF SODA.—A RECLAMATION.

In a notice of the Year-Book of Photography for 1864, in our Liverpool contemporary, we find the following paragraph:

"We notice, by the way, that the use of a weak printing bath is credited to a contributor to the Photographic News for its introduction. Now, although we disallow the assumed advantage claimed for its employment, the credit of its first introduction, whatever that may be, is unquestionably due to our *collaborateur*, Mr. J. T. Taylor. See page 363 of our last volume."

Now, of course our contemporary is joking when he claims "the credit of the first introduction" of weak printing baths for his *collaborateur*, Mr. J. T. Taylor, and refers his readers in confirmation to an article published on the fifteenth of September last. He cannot be ignorant of the fact that the use of weak printing baths is almost as old as photography itself. Without going back to the dark ages of photography, or to the period of indefinite formulæ, it is within the memory of most persons whose practice of photography dates back a dozen years, that at that period, weak printing baths were common. Taking up one of the most popular photographic manuals of ten years ago, we find, in the only formula for a printing bath to be used with albumenized paper, that 30 grains of nitrate of silver are to be used in an ounce of water, and that the albumen solution for preparing the paper should contain 6 grains of chloride of ammonium to the ounce. Since that period a strong feeling has gained ground, until recently, in favour of more highly salted paper and stronger nitrate baths; and for the last few years the plentiful excess of nitrate of silver has been considered imperative to success. But throughout the dominant period of strong baths, weaker solutions have not lacked advocates. Steadily and consistently at intervals, for years past, we have received, and noticed or published, communications from a gentleman signing "N," who occupies a seat in the legislature of the realm, enforcing the possibility of obtaining good prints with weak baths, and illustrating his remarks by charming prints, produced on 20-grain baths; and similar communications have occasionally appeared in our contemporary the *Photographic Notes*. It is somewhat droll, then, to find a grave claim for "the credit of its first introduction" made for a gentleman whose communication on the subject appeared just five months ago, and by whom, we must add in justice to that gentleman, no such claim was made for himself.

It is possible, however, that our contemporary, in writing of weak printing baths, meant the use of nitrate of soda in combination with weak silver solutions. It is probable that this is what he really means, as it is the use of nitrate of soda, for the introduction of which the credit is given in our Year-Book to a correspondent of the Photographic News, and no such claim as that alleged is made on the score of weak printing baths. But if, in reference to the latter subject, our contemporary is inexact or oblivious of facts, his statement, if it refer to the introduction of nitrate of soda, is still more definitely inaccordant with facts. On page 363 of our contemporary's last volume, to which he refers, date, September 15th, 1863, we find Mr. J. T. Taylor's article recommending 20 grains of nitrate of silver and 40 grains of nitrate of soda to 1 ounce of water. On page 203 of our last volume, date April 24th, 1863, is a letter signed "Publicola," recommending 20 grains of nitrate of silver and 60 grains of nitrate of soda to an ounce of water. Thus the suggestion of our correspondent was published nearly five months prior to the date to which our contemporary states it "unquestionably" belongs, and, moreover, our note to the communication then published referred to similar experiences, but with other agents, published by our American brethren, at a still earlier date.

It is due to our correspondent, a metropolitan photographer in extensive practice, and member of the South London Society, from whom some other good suggestions have emanated, that we make this reclamation. And it may be worth while to suggest to our contemporary, that when a person commences to write by avowing that he is going to "be honest, even at the risk of being thought ill natured," he is often in that frame of mind which will be sure of the ill nature, without being equally sure of either honesty or truth.

Critical Notices.

THE SILVER SUNBEAM: A Practical and Theoretical Text-book, on Sun Drawing and Photographic Printing. By J. Towler, M.D. New York: J. H. Ladd; and Liverpool: J. Atkinson.

Dr. Towler, who is professor of natural philosophy, of mathematics and modern languages, in Hobart College, and of chemistry and pharmacy, and Dean of the Faculty in Geneva Medical College, is best known to photographers as the Editor of *Humphrey's Journal*, and writer of the excellent "Short Lessons" we have quoted from its pages. The very poetical title chosen for his work might mislead the casual observer into mistaking the character of the book, which is essentially practical. The work is not simply the production of an accomplished scholar, but of one who has worked out to a practical issue the greater part of what he describes. In the space of some three hundred and fifty 12mo pages, we have one of the completest manuals of photography that have been issued. It embraces every branch of the art, the processes in daily use being treated in minute detail, whilst the less popular or necessary branches are stated with clear brevity. Such a work is of necessity, to a large extent, a compilation; it would be comparatively valueless if it were not so, and it would be little better if it were only a crude compilation of ill-arranged materials. But we have here a mass of matter which has been collected, appreciated, digested, and arranged, so that it comes before the reader with all the clearness, force, and freshness of originality.

The arrangement of the work is exceedingly satisfactory. After disposing of introductory and historical matters, we have chapters on the selection and use of apparatus, on the manufacture of chemicals, on the preparation of solutions, on the various wet manipulations, on printing, &c., all very fully described. We have then dry processes of various kinds, processes without the salts of silver, and a host of miscellaneous interesting matters, such as the production of transparencies, copying, enlarging, microphotography, celestial photography, heliochromy, &c., &c. We repeat that it is one of the most complete text-books yet issued, and we have pleasure in commending it to our readers.

THE UNIVERSAL TEXT-BOOK OF PHOTOGRAPHY: or, Manual of the various Photographic Processes, Instruments, Art Desiderata, &c. Second Edition, illustrated and enlarged. London: Lemare; Leeds: Harvey, Reynolds and Fowler.

The new edition of this work is not only considerably enlarged, but vastly improved, the marks of haste which were

visible in the first edition, having disappeared in the process of a complete revision. We had before to describe it as a mass of valuable matter without system or arrangement. In the second edition, we have additional valuable matter, and all very carefully arranged; whilst, without the sacrifice of anything important, a good deal of new matter is given. Amongst the most valuable of the new chapters, is an excellent one from the pen of our esteemed contributor, Mr. Valentine Blanchard, on "Instantaneous Photography," which will be read with interest by all who have seen his charming instantaneous pictures. There is also an article on "Backgrounds, Ornament, and Decoration," from which many valuable hints may be obtained. The brief chapter on the materials employed is valuable for the popular manner in which the information is conveyed. The chapter on lenses, which is re-written and extended, gives some useful information, but is, we think, misleading in some of its statements of fact. The work is however altogether a comprehensive and valuable one, especially distinguished, moreover, although issued by a trading firm, by an entire absence of all suggestion of a trade catalogue. We wish it every success.

THE YEAR-BOOK OF PHOTOGRAPHY, AND PHOTOGRAPHIC NEWS ALMANAC FOR 1864. London: Thomas Piper.

For obvious reasons, we do not enter into any critical estimate of this publication, but we may, in noticing this year's issue, briefly refer to its character and purpose. The rapid progress of photography, both in its minor modifications and its more important discoveries and improvements, has impressed the Editor with the importance to the busy practitioner of the art, absorbed in the pursuit of his own branch, and to the amateur whose attention cannot be given solely to the subject, of possessing in a compact form for ready reference, an epitome of the actual discoveries of the year, and a restatement of popular processes, embodying such modifications and improvements as have actually taken a permanent position in the practice of the ablest photographers. This is the purpose of the Year-Book—to preserve a record of the latest improvements, and form a text-book of the present practice of the art.

Besides the features necessary to a year-book, the present issue contains some original articles on subjects of interest and importance to the details of which easy reference may be desirable. These comprise an article on Combination Printing, by Mr. H. P. Robinson, of Leamington, who has distinguished himself as *facile princeps* in this branch of the art; articles by Mr. Blanchard on the Production of Transparencies in the Camera on wet collodion; and on Printing on a Commercial Scale; an article on the Solar Camera, by Mr. SydneySmyth; and an article on the Management of a Photographic Business, chiefly contributed by one of our first professional photographers, all of which will be, we believe, found valuable by photographers.

Besides these, and a *resumé* of the photographic progress of the year, details of the photographic societies, their officers, times of meeting, &c., the work includes, under the head of "Processes and Formulæ," the Selection, Mixing, and Manufacture of Collodion for wet process, for pyrogallic acid development, for dry plates, for tannin plates, and for iron negatives; the Preparation and Management of the Nitrate Bath, Correcting Disordered Baths, Development and Developing Solutions, Diffused Light, &c.; Modes of Fixing, Intensifying Processes, Reproductions, Red Deposit from Intensifying, Instantaneous Photography, Transparencies, Positive Collodion Process. Under the head of "Printing Process," we have Albumenized Paper; the Silver Bath; Toning Processes; Perfect and Permanent Fixing; Double Printing; Grey Vignettes; Mounting Photographs. An illustrated article on Glass Rooms and Lighting the Sitter. An article on Recovery of Silver from Residues. Under the head of "Dry Processes," is given the Tannin Process; the Collodio-Albumen Process; the Fothergill Process; Dry Collodion without Preservative. Under the head of "New or Modified Processes" the following discoveries of the year are described:—Photographs in Printing Inks; Catechu as a Substitute for Tannin; Transferring from Albumenized Paper; Increasing Sensitiveness of Wet Plates; Moist Sensitive Photographic Plates; Intensifying by Light; Iron Development for Dry Plates; Sugar of Milk in Iron Developing; Gutta Percha Paper; Photolithographic Processes; Morvan's and Marquier's Processes; Mr. Wood's Method of Transfer; Mr. Gibbon's Photolithography; New Fixing Agents; Oxide of Silver Printing Bath; Rapid Alkaline Dry Process. Articles on Enlarged Negatives, with Table of Enlarging and Reducing; Card Portraiture; Copyright and Registration Apparatus; Photographic Patents; Miscellaneous Tables; Postal Regulations, &c.

In the inevitable haste accompanying the production of a work of this kind, a few unimportant errors have escaped notice, amongst which we may mention the retention in the regulations of the Photographic Exhibition of a statement (which referred to last year's Exhibition) that prints should be sent to the Suffolk Street Gallery before the 22nd of December, an intimation which could not mislead any one, as it is stated just before that the Exhibition would open early in the year. Also, in an article on the Management of the Nitrate Bath, it is directed in the instructions for iodizing the bath, to add three grains of iodide of potassium to one ounce of solution, instead of to one *pint* of solution. Such errors, although trifling, are to be regretted; but we trust they will not detract from the usefulness of the work to its very numerous readers.

FANCIES ON THE PHOTOGRAPH. A Poem in three parts. By John Rorke. London: Longman and Co.

The author of this little work, of whom we learn on the title page that he is author of a treatise on "The Use of the Globes," and was for many years English and Science Master in the Royal School of Dungannon, informs us that the work was written as an agreeable private exercise, which was not permitted to interfere with more important work, and at length given to the world because no popular poet had taken for his theme the marvellous and beautiful results of photography. It is put forth with the modest pretensions as falling below the merits of the subject. We have not space, nor would this be a fitting place for the analysis of the work examined as a poem, but we may remark that it consists of somewhere about three thousand lines similar to those of "Pope's Essay on Man," and contains many graceful thoughts well expressed, and will be read with pleasure by all those votaries of the art whose interest is not confined to processes and formulæ.

A NEW SYSTEM OF ENGLISH STENOGRAPHY, Or Shorthand, on the Principles of W. Stolze. By Dr. Gustav Michaelis. London; Trübner and Co.

We presume that this work is sent for our notice, from the analogy existing between stenography and photography. The former is the shorthand of written language, whilst the latter is the shorthand, in some sense, of pictorial art. To those of our readers who are interested in the theory of phonetics, we recommend this work as containing much that is curious and interesting. Those who practise shorthand will find a novel system for comparison with their own methods. But to those who contemplate the acquisition of shorthand, we should be disposed to recommend Pitman's system of phonography as simpler, and very efficient.

ON IRON DEVELOPERS AND INTENSIFIERS.

BY G. WHARTON SIMPSON.*

I can scarcely hope to find anything new to say, upon a subject like iron development, to a society which includes

*Read before the Glasgow Photographic Association, Feb. 10th.

among its members such a number of able professional photographers and skilful amateurs as belong to the Glasgow Photographic Association. Nevertheless, the most familiar subjects are sometimes better for re-examination, and in the hope of starting a discussion, by which some valuable interchange of thought and experience may be elicited, I will briefly state the result of my own experience in the use of iron developers during many years.

It is somewhat difficult to deal with a subject like development apart from collodion and nitrate baths, as the character and condition of these materially affect the question of development. Except it be necessary to speak of especial circumstances, I may state at the onset, that my general remarks apply to the use of a good sample of bromo-iodized collodion, such as may easily be met with in the market at the present day; and to a nitrate bath, neutral or very slightly acid, with nitric acid.

The *strength* of the developing solution is one of the first considerations. The best strength will depend much upon circumstances, and it is here necessary to make a distinction between the treatment of simply iodized collodion and that containing a bromide as well. A bromo-iodized collodion will bear a much stronger iron developer than simply iodized collodion, without danger of fogging, and the process of development is slower. Other things being equal, I have found a weak developer generally give the densest image, and a strong one the most harmonious negative. The reason appears to be this:—With a weak solution, the development is more gradual; the high lights appear first, and the free nitrate of silver first begins to deposit there, and, from a tendency to aggregation, continues to deposit there in greater portion than elsewhere. Hence a slowly developed negative generally presents greater contrasts of light and shade than a negative which flashes out all parts with equal rapidity, from the application of strong developing solution. The tendency to aggregation of deposit in the high lights, as the consequence of using a weak developer, is most apparent with a simply iodized collodion, or one containing a small proportion of a bromide.

It is a circumstance somewhat singular at first sight, that the proportion of acid necessary in a developer is in the inverse ratio of its strength. A weak developer being slow in its action, requires a larger proportion of acetic acid to prevent fogging or reduction on the shadows than when the development is completed in a few seconds. On the other hand, when a strong solution is used a very small proportion of acid is necessary to prevent such reduction during the few seconds necessary for completing the development with a strong developer. It is possible, however, to get harmonious negatives with shorter exposure than with a weak developer; but the strong development requires greater care in manipulating to avoid stains, greater care to avoid white light in the camera or dark room, and greater care as to the condition of the nitrate bath. Where the time of exposure is not an object, perhaps the greatest brilliancy and cleanliness, combined with delicacy, can be secured with a weak developer, with a large proportion of acetic acid. For well lighted subjects in summer, the following proportions give very fine results:—

Protosulphate of iron	... ...	8 grains.
Glacial acetic acid	... ...	20 minims.
Water	... ...	1 ounce.

The value of this developer is illustrated by the charming landscapes of Mr. Vernon Heath, which are developed with it. For portraiture, in summer, I prefer a developer a little stronger, and find excellent results from the following:—

Protosulphate of iron	... ...	15 grains.
Glacial acetic acid	... ...	20 minims.
Water	... ...	1 ounce.

Where extreme rapidity is desired, and a collodion containing a large proportion of bromide is used, as is customary in instantaneous work, a developing solution containing fully 50 grains of the protosulphate of iron, and about 20 minims of acetic acid, will give the most rapid results and the most harmonious negatives.

I have been referring hitherto to the ordinary iron developers, consisting of a solution of the protosulphate with a portion of the acetic acid added, as you are aware a great many modifications of the ordinary iron developer have, at various times, been proposed. The most recent and most popular is the *double sulphate of iron and ammonia*. This salt was first recommended to photographers as a developing agent, in the Photographic News, on account of the stability of its crystals, the tendency of the ordinary protosulphate to oxidize being almost entirely absent. Shortly afterwards, M. Meynier, of Marseilles, called attention to it as possessing many qualities as a developing agent, superior to the ordinary sulphate. It was alleged to give good results with less exposure, to give greater intensity of image, and to produce very clean and regular reduction. It has since then been extensively tried, and the balance of opinions which have come under my attention,—and I am in a position to learn a very great variety of opinions—is decidedly in its favour. My own experience is not sufficiently definite or extended to enable me to speak with certainty. In my earliest experiments I was inclined to believe it possessed very specific advantages, giving a negative of great delicacy, sufficient intensity, and excellent colour, with one application of the solution. Subsequent experiment with another sample was less satisfactory, and I have not had opportunity of repeating the experiment with sufficient care, and to a sufficient extent, to enable me to form a very decided opinion of its merits.

The saccharo-sulphate of iron has, in my hands, given universally satisfactory results. As this salt is not commonly manufactured, I may mention the method of its preparation: 200 parts of pure protosulphate of iron are dissolved in 100 parts of boiling distilled water; 50 parts of crystallized sugar candy are dissolved in 30 parts of boiling distilled water. The two solutions are then mixed; crystals are deposited at a temperature of 95° to 100° Fahr. These are collected and dried between folds of blotting paper, and preserved in a stoppered bottle. The crystals are oblique, rhombic prisms, of a rich green colour, having the following composition:—

Protosulphate of iron	54·57
Sugar	12·93
Water	32·5
	100·00

I have used the developing solution of various strengths, with this salt. With 60 grains of the saccharo-sulphate, and 15 minims of acetic acid, I have obtained instantaneous negatives of sufficient density to need no after treatment. The colour is of a rich non-actinic colour, resembling that often obtained by pyrogallic acid development.

The *acetate of iron* has never given me so much satisfaction. I find it extremely uncertain in its action, and very unstable. It has been recommended as giving greater intensity than the sulphate; but the quality is extremely doubtful. In making experiments for the further verification of certain points to be alluded to in this paper, I prepared five different developing solutions, each containing relatively an equivalent amount of protosulphate. These I numbered, and asked a skilful professional photographer to try them and report, without knowing their composition. With the acetate solution, a thin phantom image only was obtained, utterly useless for any purpose, a continued application of the solution only producing a muddy surface deposit, without adding to the intensity of the image. All the other solutions under the same circumstances, gave clean, good, vigorous negatives—that produced with the saccharo-sulphate being the best. This was with a bromo-iodized collodion, and a bath containing a trace of nitric acid. It is probable that, with a simply

iodized collodion, and a bath containing acetic acid, the acetate developer would have given better results.

Nitric acid is not commonly used in a developing solution for negatives. Nevertheless, I have found that in bright warm weather the use of a solution containing one minim, or rather less, to twenty grains of the protosulphate in an ounce of water, without any acetic acid, gives clean, brilliant, intense negatives.

Formic acid has received much commendation of late as an accelerator in the developing solution, whether of pyrogallic acid or salts of iron. I have seen many very fine negatives produced by its aid, and have myself produced some striking results. One great difficulty in the way of satisfactory experiment is the uncertainty as to strength or purity in commercial samples of the acid. My own results have been neither so numerous nor so uniform as to enable me to give a personal opinion of its value.

Alcohol I very rarely use in a developing solution. It is generally useless, and sometimes mischievous.

The age of the solution of iron is a subject of some importance, upon which considerable difference of opinion exists. Some able photographers prefer to make a fresh solution for each day's use, alleging that much greater certainty is thereby obtained. Others prefer an old and slightly oxidized solution. M. Gaudin asserts that the presence of a portion of persalt in the solution of protosulphate prevents fogging, and renders acetic acid unnecessary. My own experience largely confirms this opinion. I have at times dissolved one pound of protosulphate in a Winchester quart bottle (half a gallon) of water, adding about a couple of ounces of acetic acid. I have found this solution, carefully corked, keep good for months, and that it might be diluted down for use without any further addition of acetic acid. Operators accustomed to the production of glass positives are familiar with the value of an old iron solution in preserving clean shadows.

The Manipulation in development is perhaps the most important point; but one on which the least can be efficiently said. On skilful development of the negative, by far the largest share of purely photographic excellence depends. I do not intend, however, to enter into any remark on the careful judgment necessary to determine when that point in development or intensifying is attained, upon which the greatest amount of delicacy, gradation, and brilliancy depends. I have merely one suggestion to offer upon a point often neglected; the mode of applying the developer to the plate. It is primarily of importance to cover the plate as rapidly as possible, so as to avoid stains, lines, and ridges, from uneven flowing or stoppage in the spread of the developer. Many operators cover the plate with one dexterously-thrown wave of the solution; but do not take sufficient care to avoid driving a portion of the free nitrate off the plate with the developer, which runs over the edge of the plate. This is a frequent, but unsuspected, cause of thin images. I have said that I very rarely use alcohol in the developer; I find that by a careful mode of pouring the solution on to the plate, which, by a neat turn of the left hand, is inclined with a gentle movement, at the same time, it is possible to make the developing solution flow in one steady deliberate wave from one end of the plate to the other without stopping or causing a mark, and at the same time without spilling a drop of the developer or free nitrate, which mingles with it as it flows. I find that even development, and a fair amount of intensity in the image, depend very much upon skilful manipulation.

Intensifying with Iron Solutions.—Many photographers prefer the negative which is intensified with iron, to that which is intensified by any other method, as possessing more delicacy and gradation, and giving a good print with less exposure than other classes of negatives. Some, following Mr. Wilson, of Aberdeen, after getting all that they can by a first development, cover the plate with a little fresh solution from the nitrate bath, and again apply the ordinary developer. The objection to this plan is the great danger of producing stains and irregular reductions. Others use the ordinary developer with a few drops of a solution of citro-nitrate of silver, similar to that recommended by Major Russell for development of tannin plates. On the whole, I prefer the principle first published by Mr. Blanchard, of using a weak solution of protosulphate of iron with a large amount of citric acid, and a few drops of a fresh solution of silver. In summer, a solution containing—

Protosulphate of iron	5 grains
Citric acid	5 „
Acetic acid	20 minims
Water	1 ounce

gives very excellent results. A fresh solution of nitrate of silver may be added, and used in the light without decomposition. In winter, the citric acid may be reduced one-half without disadvantage. The acetic acid may be omitted, but the colour of the deposit will not be so non-actinic. I prefer a fresh 10-grain solution of nitrate of silver to add to the iron solution. If a few drops be taken from the bath, it is more apt to decompose and fog the picture. I have used tartaric acid in place of citric acid; but the tone of the picture is then very blue, which allows too much light to pass through the densest part of the negative in printing. A great advantage of iron intensifying is, that the negative may be intensified before fixing with much less washing than when pyrogallic acid is used. I think the negatives are also of a better quality. It may be used after fixing as well as before, just in the same manner as pyrogallic acid.

I am afraid I have now exhausted your patience by a repetition of common-place facts known to most of you. My object has been, by a simple statement of my own experience, to elicit the views of a number of gentlemen, able to confirm or correct it by stating the results of their own practice. If I succeed in this, my remarks will not be

"——as tedious as a twice told tale,
Vexing the dull ear of the drowsy man."

POSITIVE PRINTING WITH SALTS OF IRON.

BY SIGNOR BORLINETTO.

My experiments are based on the well known discovery of Sir John Herchel's, that "citrate of iron is modified by light, and that afterwards treated with a solution of nitrate of silver, the picture acquires a more intense colour;" it may then happen that the salts of iron, such as the oxalate, the tartrate, the malate, and others, will give analogous results.

All my attempts to obtain the preservation of the lights of the picture and its stability were fruitless, in making use of the solution of nitrate of silver indicated by Sir John Herschel; the experiment was made several times, but the paper was, in a manner, reduced to powder.

I sought for the means of avoiding the destruction of the colouring matters produced by this process, and I tried the addition of alcohol to the nitrate of silver, hoping in this manner to render the picture permanent.

I operated in the following manner.

First I prepare a solution composed of—

Oxalic acid	3 parts
Distilled water	18 „

into which I carefully put 6 parts of carbonate of iron, which is mixed by stirring in, and then left to settle for twenty days.

Next, I prepare a solution of—

Nitric acid	1 part
Distilled water	6 parts
Carbonate of iron	3 „

This is well stirred, and also left for twenty days to settle. The two solutions are decanted, and 10 parts of the solution of oxalate of iron, and the same quantity of a solution of citrate of iron, are added. I then take a tuft of cotton

upon which I put a few drops of this last solution, and rub it lightly over the surface of a sheet of good letter paper. In a few minutes the paper becomes quite dry, and ready to be operated with. In the sunshine, the time of exposure is about half that usually given; in the shade, it requires four or five times as much exposure. The picture is afterwards obtained very rapidly by employing the following solution:—

Alcohol	30 parts
Nitrate of silver	1 part

The nitrate is precipitated, and the picture appears, as by magic, of a splendid black. It is next placed in the following solution—

Citric acid	1 part
Distilled water	10 parts

This solution improves with age.

To obtain equal tones, the proof must be moved about in the solution, and afterwards washed in pure water, then immersed in a solution of ammonia, not too strong, for two minutes, again washed and dried, and the picture is permanent.

This process is equally applicable to canvas, silk and cotton. When we operate with the solution of citrate of iron only, the picture developed by the nitrate of silver is of a blood-red colour.

If we operate with the solution of tartrate of iron, the picture is rapidly developed with the alcoholic solution of nitrate of silver; it does not become visible immediately, nor in a fixed number of hours, but it acquires its intensity gradually in the course of a few days, assuming a deep sepia hue.

The pictures obtained with citrate and tartrate of iron are not artistic, but the results obtained will doubtless interest all who are engaged in photography.—*Le Moniteur de la Photographie.*

DRY COLLODION.

BY P. PIARD.

This process is based upon a particular kind of film which yields collodion under the separate and combined action of caustic potassa and iodide of arsenic.

Pyroxyline.—Dissolve 10 parts of caustic potassa in 300 parts of water.

When the solution is made, immerse in it, small portions at a time, as much pyroxyline of good quality as it will contain: stir the mixture well, and allow the liquid to act on the cotton for half an hour; then carefully wash the product, so as to completely remove all the caustic potassa the fibres of the cotton contain: then dry this cotton, and keep it for use, between two sheets of paper.

Collodion.—Dissolve in

Alcohol at 40°	30 parts.
Iodide of cadmium	1½ „
Bromide of cadmium	½ „

which is mixed with

Ether at 62°	70 parts.
Pyroxyline, prepared as above ...	1 part.

Stir, and when the cotton is completely dissolved, a small piece of caustic potassa, the size of a millet seed, is put into the bottle, which is shaken frequently at intervals, then left to settle; 48 hours afterwards, the liquid, which should be colourless, is decanted, taking great care that none of the impurities remaining at the bottom of the bottle are allowed to pass over. Iodide of arsenic is then added in minute portions, until the collodion assumes a bright yellow tint: it is then left to settle, and after a few hours, the collodion is ready for use.

Silver Bath.—Every ordinary silver bath, provided it gives an acid reaction, is good for this purpose. It may, however, be prepared with

Distilled water	500 grains.
Nitrate of silver, crystallized ...	40 „

which is saturated with iodide.

Developing Solution.—

Distilled water...	1 ounce.
Pyrogallic acid	1½ grain.

Acetic acid, varying from 2 to 6 per cent.

Manipulation.—The plate is coated and sensitized in the usual manner; only, upon its removal from the silver bath, it is passed into two dishes of rain or distilled water, and left to dry; the plates are kept in well closed boxes.

Exposure.—The time of exposure is very nearly the same as with wet collodion. To give a more exact idea of its great rapidity, I may add that I obtain a transparent positive by the light of a paraffin lamp in one second, and that with an ordinary half-plate lens, with large diaphragm, I obtain a portrait at this season, with fifteen seconds' exposure.

Development.—After moistening the film, by immersing it for a moment in a dish, or by simply throwing water upon it from a washing bottle, the plate is covered with the pyrogallic acid solution, gradually adding one or two drops at a time of a silver bath of 4 per cent. strength, until the proof attains the desired vigour. The picture is fixed as in the wet process.

Remarks.—If the exposure is insufficient, the picture is hard and imperfect.

If too long exposed, the picture is grey and dull, without vigour. And if the time be well calculated, a very fine picture results, well modelled, and extremely vigorous.

The plates will keep in good condition a long time.

The collodion does not become detached from the plates.

This process does not give stains; and, lastly, it is very simple and easy.

The part that the iodide of arsenic plays in this process is, first, purely chemical, and may be indicated by the following formula:—

$$4KO + ArI^3 = 3KI + KO, ArO^3$$

the result is to destroy the caustic potassa existing in the collodion in a free state, and producing iodide of potassium and arseniate of potassa.

Its other effect consists also in modifying, but in a different manner, the collodion already attacked by the caustic potassa, in consequence of the property this iodide possesses, in comparatively weak doses, of gelatinizing ordinary collodion.

P.S.—One of my friends, M. L. Lefranc, engaged in photography, assures me that arsenite of potassa has already been noticed as increasing rapidity. The presence of this salt, perhaps, contributes partly to the rapidity of my dry collodion.—*Le Moniteur de la Photographie.*

ON A METHOD OF INSTANTANEOUS ENGRAVING ON METAL.

BY MONSIEUR E. VIAL, OF PARIS.*

My second method of reproducing old engravings, and which I will designate as Process B, has for its objects, firstly, the transfer of the engraving, and, secondly, the engraving of the transfer, and depends—

1stly. Upon the transfer.

2udly. Upon the phenomena of electro-chemistry.

The transferring of old engravings presents many difficulties; in fact, when a proof has been kept several years, the fatty body of the ink is completely resiuified, and forms, with the carbon, an almost impenetrable mass, presenting a very great obstacle to the revival of the ink. If the ink employed is too liquid, the paper absorbs, little by little, all the greasy matter thereof, and thus another difficulty is encountered. On the other hand, the nature of the paper, its texture, porosity, and thickness, and the sizing which it has or has not undergone, are so many obstacles which have to be overcome.

After numerous experiments, I have at length been enabled

* Continued from page 81.

to surmount these difficulties almost completely by applying to the surface of the proof a preparation of petroleum or turpentine; the ink soon becomes impregnated therewith, and when the proof (slightly dried between two sheets of bibulous paper) is passed under the press in contact with a steel plate, this preparation, having a greater attraction for the plate than for the paper, soon becomes detached from the latter, carrying with it a small portion of the black of the ink.

I am perfectly convinced of the success of these transfers, but in order not to compromise the safety of bank-notes, drafts, &c. which can be faithfully transferred by this process, I shall not enter into the details of this manipulation, but pass on to the method of engraving such transfers.

All that is necessary to effect this is to plunge the plate into a bath composed of a saturated solution of sulphate of copper containing a small quantity of nitric acid, when the copper is immediately precipitated upon the plate in all its metallic brilliancy, leaving, however, the lines intact, so that the copper then serves as a varnish to resist the acid, whilst the steel, having a greater affinity than the copper for the acid, is corroded or "bitten in" thereby, under or through the lines, by the phenomena of electro-chemistry. The problem may be summed up in two words, viz., *coating* and *biting* at the same time.

The effect produced may be described as follows:—When the steel plate (with the drawing or transfer in greasy ink on its surface) is plunged into the acid solution of sulphate of copper, those parts of the surface which have not received any portion of the ink are immediately coated with metallic copper. The solution penetrates at the same time by imbibition through the greasy matter of the ink and reaches the metal beneath, when a voltaic pair (copper and steel) is immediately constituted, the copper already deposited forming the negative pole, and the steel, not yet attacked, being the positive pole. An electro-chemical decomposition of the sulphate of copper then takes place, and at the same time the steel is attacked by the sulphuric and nitric acids. The operation proceeds tranquilly, without any effervescence or disengagement of gas; no other kind of "biting in" takes place so calmly. About ten minutes afterwards, the steel plate is withdrawn from the bath, perfectly engraved,, and nothing further is required but to remove the copper from the surface by means of ammonia, to render it fit for printing from by the ordinary plate printing process.

One of the most remarkable effects of this process is that all the gradations of an engraving from the highest lights to the deepest shades, are produced at one simple operation, without any artificial "stopping out" whatever; the length of time each part is under the action of the acid being always exactly proportioned to the thickness of the layer of ink at that particular part. For example, when the plate is first placed in the bath the copper instantly covers and protects from the acid the exposed surface, *i. e.*, the white parts of the engraving; the acid next attacks the finest lines, or those parts where the thinnest coating of ink exists, and by the time these lines have been engraved to a sufficient depth, the copper spreading laterally from the edges will have entirely covered and "stopped out" these portions, whilst the broader and deeper lines will resist the deposit of copper (and hence remain exposed to the action of the acid) for a longer time; and so on to the deepest shades, which will remain still longer exposed to the action of the acid, whilst all the lighter parts of the engraving are effectually protected by the copper deposited, so that, in fact, each line will be infallibly engraved to a greater or less depth in exact proportion to the thickness of the layer of ink, which is precisely the effect desired. This same phenomenon also prevents the possibility of lateral corrosion, and, on the contrary, causes each line to narrow as it deepens, and to assume as near as possible, the V-shaped form produced by the cut of the angular point of the graver.

Third Process. The method above described, of acting upon steel plates, by sulphate of copper, naturally led me still further, and thus I arrived at my third process, which is merely an extension of the preceding method.

It consists in making an autographic, lithographic, or other transfer on to the steel plate, not by a preparation of turpentine but by a greasy ink only, or in making a heliographic or photographic drawing or transfer on the same by means of bitumen of Judæa or alkaline bichromates, or in drawing on the steel direct with indian ink, chalk, or black lead pencil; or painting thereon in lead or pastel, or drawing in perchloride of iron or acid; in a word, making a transfer or direct drawing upon the steel plate, with any body or medium capable of resisting the deposit of copper, without opposing the attack of the acid, or with any body capable of depolishing the steel in parts, which will be engraved when the plate is submitted to the action of an acid bath of sulphate of copper.

I may thus generalize my method, and extend my particular process of biting on steel to an entirely new kind of engraving, destined, I believe, to take an important rank in this art as a rival to the aquafortis and lithographic processes.

The process is remarkable from the circumstances under which it takes place, and surprising from the results which it yields; for to attack the greasy body, which until now has been a protection to the steel, and to leave the polished surface intact, is exactly the counterpart of any process hitherto known. To preserve to each artist his own peculiar touch and feeling; in a word, to perpetuate his individuality; this is to arrive at the object so earnestly sought, viz., translation without the aid of an interpreter; or, in other words, engraving without the assistance of the engraver.

This process has the two attractions of novelty and simplicity; it does not require practice, and I may add that it surpasses all other processes in the rapidity and fidelity of its execution. Its importance for engraving geographical maps and topographical plans is very great, if we consider that an engraving upon stone (which rivals copper plate in fineness), can be transferred readily on to steel by these means; we then have an economy equal to one-third in time and one-third in expense. The plates are almost inexhaustible, the printing always the same, and much superior to lithographic transfers, which always deteriorate by printing, and at the same time a heavy, cumbrous, and fragile material is also done away with. It may be applied to engraving arms for warlike or sporting purposes, and cutlery, for the reproduction of copper or steel plates, to lithographic engravings, or the transfer of lithographic engravings on to steel, and to the engraving of photographic proofs or transfers, whether obtained by means of bitumen of Judæa or alkaline bichromates, and to a variety of other useful purposes where rapid, faithful, and economical engraving is required.

Since writing the above, I have succeeded in transferring some old prints, both of engravings and letter-press, on to stone in the most perfect manner, by my process. Some proofs of the letter-press will be shown to the society, and also the stone with the transfer of the engraving thereon.

In the discussion which followed, Mr. George Wallis, after some other remarks, said, if a photograph could be first transferred to stone and then the photo-lithograph transferred by this process on to a steel plate, a great advantage in an increased power of multiplying proofs was obtained, inasmuch as the lithographic stone became deteriorated in working in a far greater degree than the steel plate. He thought, however, from the specimens he had seen, that this process did not, in some respects, quite come up to that of which he claimed to be the inventor, inasmuch as by his plan the broader tints were more readily reproduced.

After some further discussion, Mr. George Cruikshank said, he considered it a very valuable addition to the means of reproducing works of art. Although it had been stated that only 750 impressions could be calculated upon from one plate, yet from the rapidity with which the plate could be reproduced, all practical difficulty in this respect was removed, for the number of impressions was thus practically unlimited. At the same time, he did not believe it would ever completely supersede the etching tool; for instance, such small faces as he put into some of his illustrations, he did not think could be produced by any other instrument than the etching point. The fact was, however, that an artist who had the power of design did not often care to bestow much time upon mechanical labour, and therefore such a process as this would be valuable to him.

Mr. Joubert said there was one thing in the details of this process which appeared to him very extraordinary, and that was that (as stated by the inventor) the lines of the engraving were formed of a V-shape, similar to a line cut with the graver, although it was known that the effect of acids upon metal was to bite in horizontally as well as vertically. If that were the case it was very remarkable, because it was an example of effects produced by acids which had never been obtained before. He had himself been for many years practically engaged in engraving, and he had always found that the great difficulty

in any chemical process hitherto applied, either on copper or steel, had been to prevent the acid running under the lines and widening them at the bottom. It, however, did not appear to accomplish one thing which was a disideratum in the reproduction of photographs, viz, the half-tone. Hitherto all previous processes had stopped at that point, and in this respect, although it was somewhat in advance of anything he had yet seen, it was not altogether successful. What they wanted was to reproduce the half-tone of photographs so that the pictures might be printed from a metal plate. As yet the intervention of photo-lithography was still required, and photo-lithographs were always imperfect in this respect. He hoped the inventor would be able to carry his process on so as to arrive at the result of producing a plate direct from a photograph. If he succeeded in doing that, he would indeed accomplish a great work, but for what he had already done he well deserved the thanks of all lovers of art.

Dr. Bachhoffner said, without depreciating the importance of the invention, it reminded him of similar results obtained by Mr. W. R. Grove. In the preparation of the ordinary daguerreotype the surface of the plate was covered with a thin film of gold, and Mr. Grove made the coating of gold on the plate serve as an etching ground, and by the action of nitric acid the design was bitten into the plate, but the process was of slower application than that which had been illustrated this evening, and although proofs had been taken from the plate, the depth of the etching was so slight that it was of no commercial value. The statement made with regard to the V-shaped line produced by M. Vial's process seemed to involve a deviation from natural laws, for it was plain that acid solutions, whether acting directly or by double decomposition, would corrode the metal in a lateral as well as a downward direction. If it could be shown by microscopic observation that in this process there was an absence of lateral bite, it was the most important invention that had been brought forward for many years. That, he thought, will remain to be proved.

Mr. Dickes said that, in reference to the V-shaped corrosion of lines in the steel by acid, referred to by a previous speaker, we need not be incredulous, as if a new law respecting the action of acids had been alleged to have been discovered. In the process before the meeting there was no new law—there was simply a taking advantage of two well-known facts—one relating to the action of acids, the other to the deposit of copper. When copper was deposited it was not only thickened, but slightly increased at the edge; this increase would trench upon and narrow the line in course of biting by the acid, and would counteract widening or under-biting—the combined action resulting in a line narrower at the base than at the surface, in fact V-or shallow U-shaped.

The process described in the paper was practically illustrated by M. Vial himself, who produced a steel plate on which a drawing had been made, immersed it in the bath, and at the end of a few minutes took impressions from it. These, however, had not quite sufficient depth, owing to the plate having remained too short a time in the bath. A number of prints from plates on which drawings had been made by Gavarni and other leading French artists, as well as transfers from engravings, were also shown, and appeared to be generally very much admired.

Proceedings of Societies.

Glasgow Photographic Association.

The usual monthly meeting of this Association was held on the evening of Wednesday, the 10th inst., at the Andersonian University, Mr. Stuart in the chair.

The Secretary (Mr. E. Brace) read a paper by Mr. G. Wharton Simpson, on "Iron Developers and Intensifiers." [See page 88.]

The Chairman said there was a great deal in the paper which was very interesting and valuable. He therefore suggested that the discussion of its contents should be resumed after the members had had an opportunity of reading it in the journals. There was one point which had startled him very much—that of not using alcohol in the developer. He had never found it practicable to get the developer to flow without the alcohol, especially with an old nitrate of silver bath. Again: Mr. Simpson spoke of citric acid and silver, and mixing these with the iron developer as they did with pyrogallic acid. That he (Mr. Stuart) had tried, and found it had the tendency to rot the collodion on the plate, and then in all probability it went down the sink.

Mr. Mactear said that when amateurs found their developers would not flow, it was always usual to add a little alcohol: they never could do without it.

The Chairman asked if any member had ever tried so strong a solution for developing portraits as fifty grains of the protosulphate?

Mr. James Ewing thought fifty grains must be a mistake.

The Chairman said he had tried a solution which he considered as strong as ever he had heard of. It struck him it was thirty-five grains; but then he added alcohol and glacial acetic acid, which would reduce it to less than that. His idea of this solution was that it brought out the picture too rapidly, and formed too large metallic particles on the face of the negative. It seemed not to penetrate down through the negative so well as a moderately strong solution. The solution he generally used was about fifteen grains with fifteen minims of glacial acetic acid, and alcohol more or less as he found it flowed over the plate. A new silver bath did not require much alcohol, but as it got old it required a few drops more to be added.

Mr. James Ewing said he quite disagreed with Mr. Simpson in regard to the rapid development of pictures. He believed a picture flashed out at once was not such a fine picture as one slowly developed. In the latter case the higher lights and lower lights were more gradually melted into each other than when the picture was flashed out. Generally, they could get no intensity whatever with a quickly-flashed-out picture. In fact, those very quick pictures generally lacked body, and had to be brought up by powerful intensifiers afterwards.* He thought a developer of twelve grains, with the usual quantity of alcohol and acid, was as good a developer of the nature of an iron solution as they could get. He endorsed the opinion of Mr. Simpson in regard to citric acid development. He thought that citric acid was a very fine developer and intensifier, and that it had not been so well studied by the photographers of Glasgow as it merited. There was a tendency, as Mr. Stuart had said, to throw down very large flakes on the surface of the plates if the proportion of silver was too large for the quantity of acid; but, with care, and using clean silver, one could get very clean non-actinic pictures.

The Chairman remarked that it did not seem clear to him what Mr. Ewing intended that developer for.

Mr. Ewing said he used it as a redeveloper, or rather as an iron intensifier.

The Chairman.—Your idea is that you should develop with a twelve-grain solution and so much glacial acetic acid. After you have developed and washed thoroughly, you redevelop with a solution of what?

Mr. Ewing said he took the usual iron developer and an equal quantity of saturated solution of citric acid with a few drops of pure silver—about fifteen grains to the ounce—and got very good results with this solution.

The Chairman said he had tried formic acid with various samples of collodion, but he never could find that he got any quicker pictures. They seemed to be harder and whiter and more metallic-looking, but they were no quicker; in fact, he thought, in some instances, they were slower. His opinion was that no photographer should stand by one particular kind of developer; he should have five or six different kinds, and use them for obtaining as many different effects.

Mr. Ewing asked if the Chairman had found that simple iodized collodion gave less brilliant results than that which was bromo-iodized?

The Chairman said he had found that collodion made with iodide of potassium alone, without any bromide, and developed by pyrogallic acid, acted as quickly as any bromo-iodized collodion, and with as fine results. But he had only been able five or six times to get the iodide he wished for. He never got good iodide of potassium till he got some from the Continent. It was just the same, he added, with collodions as with developers: a photographer required to have variously-iodized collodions for different classes of work, if he desired to do his work artistically.

* Mr. Ewing seems slightly to have misconceived the statement in the paper, as his experience appears to confirm that of the writer of the paper; namely, that weak developers develop more slowly and give greater intensity than strong ones.—Ed

After some further conversation, the subject dropped, with the understanding that Mr. Simpson's paper should be further discussed at the following meeting.

There were exhibited a new camera and travelling photographic apparatus recently introduced by Mr. Thomas Sutton, of Jersey, and which, as the Secretary explained, had been sent by that gentleman to the Photographic Society of Scotland.

The Secretary read the explanatory paper by Mr. Sutton, which had been read before the society just referred to. The apparatus and collection of photographs which accompanied it were examined with great interest.

The Chairman said the picture sent as the production of the Dallmeyer lens was not a good specimen of what that lens could produce.

Mr. Archibald Robertson was of the same opinion. He thought Mr. Sutton's camera contained a great many very ingenious contrivances.

Votes of thanks were accorded to Mr. Simpson and Mr. Sutton.

Messrs. John Milne Watt, and John Sheriff were elected members, and the meeting shortly afterwards adjourned.

South London Photographic Society.

The usual monthly meeting was held in the City of London College, on the evening of Thursday, Feb. 11th, Mr. Sebastian Davis in the chair.

The minutes of a previous meeting were read and confirmed, after which Mr. T. Williams was elected a member of the society.

The Secretary exhibited some studies by Mr. Rejlander, one of which, a study of drapery, he stated, had been mistaken by artists for a photograph of Greek sculpture. Another, called the "Widow and Fatherless," he thought a triumph of the power of photography in rendering expression.

Mr. Ross exhibited an album containing a number of photographs illustrating the working of his lenses.

Mr. Sandford exhibited some prints showing the very high surface and brilliant results of his new *Sûxe* paper.

Mr. Burr exhibited a number of specimens illustrating the satisfactory working of his card lenses.

Mr. Squire exhibited a number of specimens to show the capabilities of his improved manufacture of Shepherd's lenses.

Mr. Wharton Simpson exhibited some examples of a new carbon process, by Mr. Swan, of Newcastle-on-Tyne, which were regarded by the meeting as equal to good silver prints. (See article on another page.)

After votes of thanks to the gentlemen who had exhibited specimens.

Mr. F. W. Hart exhibited some prints which he had subjected to treatment intended to eliminate all traces of hyposulphite, and thus secure their permanency. After removing from the hypo, the prints were immersed in a solution of chloride of barium in chlorine water. By this means the hyposulphite of soda was decomposed, and a precipitate of sulphate of baryta thrown down, whilst the presence of free chlorine prevented the formation of any sulphur compound of silver in the prints. If the print were placed in this solution fresh from the hypo without rinsing, it was deepened a little in colour, but when rinsed, it was slightly bleached by the solution.

Mr. Martin asked if the precipitate consisted of sulphide or sulphate.

Mr. Hart said a sulphate.

After some further conversation, the subject dropped.

Mr. Blanchard made a few remarks for the purpose of eliciting experience and opening a discussion on lime toning. His own experience was favourable to its use. He had tried the formulæ given by Mr. Parkinson and Mr. Hughes with uncertain results. At times, the results were good, and at others, under apparently similar circumstances, they were unsatisfactory. Careful experiment had convinced him that the uncertainty was due to the uncertain character of the commercial article, and to the use of too much chloride of lime. Using a minimum proportion, he met with uniform success, and found the results equally good for portraits or views. After neutralizing the gold solution with carbonate of lime, he then added about one-eighth of a drop of a saturated solution of chloride of lime for each grain of chloride of gold.

Mr. Evans had used the lime toning bath for upwards of 12 months, with uniform success. He must confess to a little want of exactness in the formula. He took some chloride of lime and some carbonate of lime, and shook them together in water, taking care to have sufficient excess to leave a large sediment. Of the saturated solution so formed, he took 2½ drachms, and added to 6 grains of chloride of gold in a sufficient amount of water. He never found any difficulty in getting good results. He did not wash his prints before toning.

Mr. Henderson remarked that when the chloride of gold was sold mixed with chloride of sodium, less chloride of lime would be necessary.

Mr. Evans had used the formula of Mr. Laey, when it was first published in the News, very successfully.

Mr. Simpson said, that some confusion seemed to prevail as to what were termed saturated solutions of chloride of lime. At first sight the photographer was apt to believe he had obtained a saturated solution, when he found a permanent precipitate at the bottom of the bottle, but this precipitate generally consisted of hydrate of lime deprived of chlorine or hydrochlorous acid, and they might go on adding more chloride of lime, and producing a more bulky precipitate, but they, at the same time, added more of the chlorine, &c., to the water. The presence of a precipitate was no proof of saturation, and formulæ, based on the use of a saturated solution, became uncertain. The solution was, moreover, apt to change with keeping.

Mr. Blanchard made a fresh toning bath from day to day, but he kept a large quantity of the chloride of lime solution ready for use, and modified the quantity according to the results produced.

Mr. Hart said he found it desirable to cover up the bottle containing a solution of chloride of lime with brown paper, and keep it in a dark place. It was better kept in small bottles than in large ones, which were a long time partially empty. He was in the habit of adding 2 ounces of chloride of lime to 20 ounces of water; he then added 1 ounce of washing soda, and placed the solution in the light for a short time. This caused a disengagement of carbonic acid gas. This threw down lime, and he got a saturated hypochlorous solution. The bottle was then placed in the dark. He used no fixed proportions, but just added as much of this to the gold solution to enable him to detect its presence by smelling. So long as the smell was present, he used the same solution, adding gold, if necessary; and when the smell was absent, adding a little of the other solution again.

Mr. Blanchard said he had intended to try chlorine water, which would probably answer the purpose as well or better than chloride of lime. He asked Mr. Martin's opinion on this point.

Mr. Martin thought it probable.

Mr. Simpson suggested that chloride of lime, although formed by treating the lime with chlorine, was supposed to be a hypochlorite, and that hypochlorous acid, not chlorine, might be the valuable agent.

The Chairman said that in the uncertainty as to its exact composition, the chloride of lime of commerce was generally recognized as a hypochlorite. He had found that many printers made up their toning solutions at first with chloride of gold and hypochlorite of lime, but afterwards add chloride of gold from time to time.

Mr. Hart said he did this so long as it retained the characteristic smell. But when that was gone, he added more hypochlorite solution.

Mr. Henderson asked if any one had tried chloride of copper. He had recently been trying it in his toning bath, seeing it recommended by good authorities, and was pleased with the result.

Mr. Simpson said its use had had the countenance of some good names; but theoretically, he doubted its value. In the first place, if the chloride solution were neutralized with a carbonate, the bulk of the chloride of copper would be thrown down as a carbonate of copper; and in the next place, although we knew that gold would be reduced by silver, we had reason to believe that copper would be.

The Chairman said that he thought it was an open question. A solution of sulphate of copper did act upon a toned print, which solutions of sulphates did not.

After a vote of thanks, and some further remarks, the proceedings terminated.

Correspondence.

UNSCIENTIFIC PHOTOGRAPHERS' ABSURDITIES.

Dear Sir,—In the pages of a contemporary, under the head of "Answers to Correspondents," is to be found the following *rather* extraordinary passage:—"The addition of nitrate of soda to the printing bath is one of those absurdities in which unscientific photographers alone indulge; *primâ facie*, there would seem to be no advantage in it. We can, however, understand the trial of such a mixture by a non-chemical hand, and his fancying some advantage to be gained thereby; but how any man having pretensions to scientific acquirements can repeat such an experiment *more than once*, is beyond our comprehension."

Seeing that very little is known respecting the chemistry of photography, methinks it would be rather difficult to define the meaning of the phrase "unscientific photographer," in opposition to a scientific one; however, I venture to say that no person will have the hardihood to affirm that it is an "absurdity" for any man, be he a chemical or "non-chemical hand," to experiment in order to ascertain at what strength a solution of nitrate of silver will cease to "coagulate" the albumen, as it is called, or, that it is an "absurdity" to try the effect of a solution of nitrate of soda upon albumenized paper. Now, it happens that the originator of this mixed printing bath had a particular crotchet in his head; what that idea was is of no consequence to others, nor, whether it was "one of those absurdities in which unscientific photographers *alone* indulge." In the course of some experiments, he found that a solution of nitrate of silver, *five* grains to the ounce, removed the albumen from the paper as effectually as a solution of nitrate of soda *seventy-five* grains to the ounce had done; well, perhaps there *may* be persons of such peculiar idiosyncrasy as to say that it was an "*absurdity*" for him to mix the solutions to see whether his idea was right or not; however, he did so, and found *the mixture did not remove the albumen*. Now, it also curiously happens that this effect was in accordance with his previous "unscientific" notion.

This admixture of a strong solution of nitrate of soda gives a weak printing bath an advantage it did not possess before, as it enables the paper to retain the albumen on its surface in all its integrity; and, therefore, I am not ashamed to confess that I am ignorant enough to think it is the *especial duty* of "any man having pretensions to scientific acquirements," provided he be a photographer, to investigate this curious subject, and to see whether it may not be turned to a good account in printing; this, however, must necessarily *oblige* him "to repeat the experiment *more than once*," notwithstanding his doing so may possibly be "beyond" the "comprehension" of your contemporary. Will any scientific man explain satisfactorily how it is that a solution of nitrate of silver, when reduced in strength to such a degree as to have lost all power of "coagulating" the albumen, can have its power restored by the admixture of a stronger solution of a salt which of itself has a totally contrary effect? or, will any scientific man come forward and attempt to prove, *against facts*, that the addition of nitrate of soda to a solution of nitrate of silver cannot, by any possibility, be of any advantage, as it is contrary to the laws of nature. When scientific men have done both these things, *and not till then*, it perhaps may be allowable to assert that "the addition of nitrate of soda to the printing bath is one of those absurdities in which unscientific photographers alone indulge."

I have seen very much lately of the superior effect produced, *in competent hands*, by this mixed bath, and can assure your readers, I think with truth, that those who fail with it either do not know how to use it, or, have a bad sample of paper. It is not, I believe, generally known that much of our albumenized paper is prepared from *seralbumen* instead of *ovalbumen*; and notwithstanding chemists tell us that "in reference to chemical properties, they may be considered as identical," it is very evident that one sample of albumenized paper is acted upon in a different manner from another, by this mixed bath; this difference of action I attribute, it may be erroneously, to one sample being prepared with white of egg and the other with serum. That impurity of the nitrate of soda cannot always be the cause of the removal of the albumen, is proved by the fact that *the same bath will remove the albumen from paper prepared by one albumenizer and not from that which is prepared by another*. However great the "absurdity" and "unscientific" the idea of this mixed printing bath may be to your contemporary, its advantage is well known to many of your readers, and I venture to predict that ere long your pages will announce the success of another valuable "unscientific absurdity."—Yours truly, George Price.

18, *Mornington Road, New Cross Road.*

ON OXALATE OF PEROXIDE OF IRON AS A PHOTOGRAPHIC AGENT.

Sir,—The letter by Sir John Herschel, in your last number, gives me an opportunity of establishing in your widely circulating columns my priority to the process of obtaining photographic proofs by means of oxalate of peroxide of iron. The learned physicist just named owns that in making his interesting researches upon the action of light on salts of iron, he never employed the *oxalate* of iron. This salt, the oxalate of peroxide of iron, was first applied to photographic purposes by me in 1860, and I gave a slight sketch of the process in my correspondence to the *Moniteur de la Photographie*, of Paris, for 1st October, 1861. It was published rather more fully in a note to the Photographic News, and in the *Technologist*, in February, 1862, at which time Mr. Reynolds, of Dublin, began also to experiment with it; whereas M. Van Monckhoven and other continental photographers have only written upon the subject very recently, and have added little or nothing to what had already been done.

My process, as originally described, consisted in soaking the paper in a solution of oxalate of peroxide of iron, exposing under a negative to the light, washing off the undecomposed oxalate of peroxide, whilst the yellow insoluble oxalate of protoxide remains, forming an image faintly visible, which is brought out by plunging the proof into a solution of permanganate of potash, and afterwards into a solution of pyrogallic acid, and finally washing (*vide* Photographic News, 1862). You will perceive that this process still differs from any of those described, since it was originally published, by *totally excluding the use of any salt of silver*. And no doubt even better means of developing the image might be discovered (without having recourse to silver or gold salts) than those I have just mentioned.—I am, sir, your obedient servant,

T. L. Phipson, Ph.D., F.C.S.,
Member of the Chemical Society of Paris, &c.

The Cedars, Putney, S.W., 15th February, 1864.

MR. POUNCY'S PROCESS AND ITS APPLICATION TO LITHOGRAPHY.

Sir,—In the *Photographic Notes*, Feb. 1st, 1864, page 38, I find the following:—

"North London Photographic Society, Dec. 22, 1863.—Mr. Simpson described a method by which Mr. Pouncy has succeeded in transferring a print in printing ink to white cardboard. He said there was no difficulty in transferring the image to stone, and also no advantage, as there was a considerable, if not an entire, loss of half-tone."

I have looked in vain through your pages to find any such statement as the above; on the contrary, in your leader of Dec. 24th, 1863, in reference to my process, you say, "card portraits barely distinguishable from silver prints, * * * * perfect impressions in printing ink with every gradation of half-tone possessed by the negative." Also in Photographic News Almanac for 1864, page 83, "By this

process, a transfer with perfect half-tone may be made to copper, stone, or zinc."

As a further proof of these latter assertions, I herewith enclose you a specimen of transferring, which is simply varnished on the face of picture with a varnish I have lately prepared, and when tacky, *i. e.* (almost dry) pressing it face downwards to any surface, tinted or otherwise. On this varnish, water has no influence, consequently, the thin paper when wetted will easily peel off without any danger of injuring the print. Will you please say in your next, if this is a perfect photograph or otherwise. As these are facts that cannot be contradicted, I feel sure you will again repeat the truth by which no man ever yet was injured.—I am, sir, yours respectfully, JOHN POUNCY.

Dorchester, Feb. 16th. 1864.

[The print enclosed by Mr. Pouncy is very excellent indeed, perfect in gradation, and showing improvement in colour. Regarding the statement in the *Notes*, it is clearly the result of some misconception, as we never made any such remark. A moment's reflection would show that we could not have done so, as we were at the time exhibiting prints perfect in half-tone, which had been transferred to paper; and if the image, with all its gradations of half-tone intact, could be transferred from one paper to another, why not on to stone? The truth is, we have been looking with considerable interest for the issue of some good examples of such a transfer to stone, in order to see how far another difficulty can be overcome, which belongs to lithography, and not to Mr. Pouncy's process, or to photography at all. It is probably out of our allusion to this difficulty that the misconception has arisen. We remarked in a conversational discussion, that by Mr. Pouncy's process a transfer with perfect half-tone could be made to the stone, but that then the question would arise, whether the photographic half-tone could be produced in a print by the lithographic mode of printing. This is an interesting question to be solved, and one which could not be brought to the test until a method of putting on the stone an image with perfect photographic half-tone had been found. Mr. Pouncy's process will do this, and we look with interest for the further result. It appears to us, that in order to preserve the half-tone in working, a grain will be absolutely necessary, and much of the beauty of the resulting print must depend on the success with which a grain, suited to the subject, can be applied. Let it be distinctly understood, however, that if there be any lack here, it will arise from an inherent peculiarity of lithography, and not from any imperfection in the photographic process.—ED.]

Photographic Notes and Queries.

VIGNETTING NEGATIVES.

SIR,—I have lately adopted a plan for vignetting, which I believe capable of producing the finest effects, and after a few trials, very easy of application.

It is merely to smoke the back of the negative with an ordinary lighted candle, over the parts through which we wish to prevent the light passing. The precautions needed are, to see that the glass is clean and dry, to move the candle quickly with a circular motion, and not smoke it too much, as the colour is very non-actinic, and peels off if put on too thickly. A few trials will give the requisite dexterity. Care must be taken not to touch the smoked surface, for, if once rubbed, the entire process must be gone over again. It is advisable to place a strip of paper between the negative and the glass of the printing frame.

I am not aware that this method has been adopted, and I would suggest that photographers give it a trial, and should they find it as useful as I anticipate they will, I shall be pleased to have contributed my mite, through the agency of your valuable journal, to the aid of art; but if it proves more plague than profit, then it will end as it began—in smoke.—I am, yours faithfully, E. DUNMORE.

81, *Malden Road, Kentish Town.*

WEAK PRINTING BATHS AND NITRATE OF SODA.

SIR,—I noticed in your last publication, that "A Photographer's Assistant" sends you prints printed with a 20-grain silver solution, with the addition of 10 of nitrate of soda, which you state leaves nothing to desire. I can fully bear out the fact, that with such a bath I can produce as good and vigorous prints in every way as with an 80-grain silver bath, as I have been using a 20-grain silver bath exclusively for nearly three months, and with simply correcting it every day, before or after use, I have never had a failure with it in any way, during that time.

Enclosed I send you a couple of cartes, printed with 20 grains silver and nitrate of soda.—I am, sir, faithfully yours,

Huntingdon, Feb. 12, 1864. ARTHUR MADDISON.

[The prints are extremely rich and brilliant; nothing better could be desired.—ED.]

Talk in the Studio.

FRENCH PHOTOGRAPHIC EXHIBITION.—The French Photographic Society intends to hold its exhibition at the time when other art exhibitions are open, as the London Society has determined. A Paris correspondent says:—"The French Photographic Society held a meeting last Friday, at which it was determined to have the exhibition again next year at the same time as that of the living artists. M. Liebert, of California, exhibited an improved apparatus; and a new heliostat, provided with a vertical as well as oblique motion, was shown, but M. Léon Foucault, who is *ben pratica* of those things, was not satisfied with it. It is pleasant to remember that English photographs were by far the best specimens last year, and let us hope that, for 'the honour of old England,' we shall again beat France."

ILLUMINATED TRANSPARENT PHOTOGRAPHS. — We have recently seen some specimens of the portraits to which Messrs. Helsby and Co. have given the above name. They consist of vignetted transparencies upon opal glass, surrounded with a vignetted or graduated border of some suitable tint, having a very pretty effect. They are mounted in a neat morocco case, cleverly contrived so as to show the transparency. Such pictures, when produced on opal glass, as our readers know, are positives by either reflected or transmitted light, but much the best by the latter. As photographs, these are vigorous, round and delicate. They are described as produced by Ross's card lens. Being vignetted heads, they do not, of course, illustrate any especial peculiarities of a lens, beyond that general excellence of definition which naturally belongs to the productions of a first-class manufacturer.

AN ODD COLLECTION.—The *Telegraph* French letter recently had the following paragraph:—By-the-bye, a curious collection of prints, paintings, and photographs, "the property of a gentleman who has no further use for them"—he being dead—were sold this week in the Rue Druot. This collector did not care for "depth" or "distance," "tone" or "chiaroscuro," but the individual represented must have spectacles, and so every portrait is *orné de glaces*, like an "apartment to let," in new Paris.

To Correspondents.

LARD wishes to know, if he travels through a district selling local photographic views, scraps, &c., whether he will require a hawker's licence? As this is a purely legal question, and on a subject which has not come under our attention, we cannot give a satisfactory answer. Perhaps some of our readers can give the information.

STUDIO.—Such a glass-room as you describe, with a north side light, will answer very well. It will be better to have the side a foot higher than 7 ft. 6 in., and running up to 11 ft. or 12 ft. The south side may be opaque, and you can work from either end, using a white screen to obtain reflected light. Avoid placing the sitter directly opposite the light.

SUBSCRIBER.—Your lighting appears satisfactory, but there is a little want of force, or brilliancy, in the prints, and the tones might be richer and deeper. We will hand your letter to our publisher.

H. MILLER.—Decidedly; yes. See notice in the present number. We cannot refer you to any fuller information on the lime toning than has recently been given in our pages, and our YEAR-BOOK.

J. R. D.—You will find full information on page 134 of the PHOTOGRAPHIC NEWS, vol. vii., on the method of acquiring a copyright in your works in France. The photograph must first be published, and duly registered in this country; it must then be registered, and a copy deposited at the

Bureau de la Libraire of the Minister of the Interior, Paris, within three months of its publication in this country. The charge is 1 franc 25 centimes. 2. We do not know any one who undertakes such work in Paris. 3. We believe that just the same provisions extend to Prussia.

A. L. HENDERSON.—Thanks for the paper received. We shall have pleasure in trying it. We will let you have the address.

A. R. S.—A portrait lens is not necessarily bad, because its visual and chemical foci do not coincide; but, nevertheless, we consider such want of coincidence in the light of a defect. 2. A portrait lens of 4½ inches back focus, with a Waterhouse stop of 1 inch, would not be likely to define perfectly more than a circle of 2 inches diameter, when focussed on a wall 9 feet distant. We shall have pleasure in giving you any further information on the subject you may desire.

M. G. J.—Decidedly mealy. 2. The focus of a lens is practically lengthened as it approaches nearer to the object: therefore, with the same lens, subject, aperture, &c., a longer exposure would be required when the object was only four feet from the lens, than when it was eight feet.

B. SCOTT.—Your plan generally seems excellent: 3 ft. 6 in. opaque at the side, next the back ground, may serve, but you will find it convenient at times to have a little more.

TENBYITE.—The object of a swing back is to prevent upright lines converging in the picture, when it is necessary to tilt the camera to get in the upper part of a high building. When the plane of delineation, or sensitive plate, is not parallel with the building, which, when the camera is tilted, it cannot be, the lines fall out of the perpendicular. A swing back is intended to correct this, and allow the plate to be kept parallel, no matter what the position of the camera.

MOLECULE.—From your description, we should be disposed to attribute the defect to the glass. We have met with samples with some imperfection of surface, which had the effect of reduced silver in myriads of spots all over the negatives. We could have judged better if we had seen a specimen.

A. M.—Tone and general quality of the picture very good. The group is well arranged, except in one point. The edge of the table forms an awkward straight line from the mouth of the sitting figure.

R. H.—On the subject of fixing, it is a good rule to keep on the safe side, and never use old solutions. You may test with litmus paper for acidity. Read the article on "Perfect and Permanent Fixing" in our YEAR-BOOK. You may use a quarter-plate portrait lens for copying small pictures the same size, if you use a small stop. Or you may use the front lens (not the back lens, as you propose), of your portrait combination for that purpose. A triple lens is, as you suppose, best suited for copying, but will not be so rapid or so well suited for portraiture as a portrait lens.

ALKALI.—The new metal, thallium, is distinguished by so many novel characteristics, that some doubt existed at first as to its character and position. It has many characteristics in common with the potassium group; but, on the whole, Mr. Crookes has no hesitation in placing it amongst such metals as lead and silver. He pertinently adds, "there is no definite natural grouping: Nature is not a chain of consecutive links; it is more similar to a network."

C. SODA.—The use of too much carbonate of soda will rapidly destroy the toning powers of your bath. If you use carbonate of soda, one or two grains to each grain of chloride of gold is sufficient; but we do not recommend the use of carbonate of soda at all in the hands of inexperienced photographers. Various toning baths are given in our YEAR-BOOK.

W. J. K.—As we do not know the composition of most of the commercial samples of collodion, we cannot speak with much certainty of their keeping qualities in hot climates. A bromo-iodized cadmium collodion is most desirable for your purpose.

EUPHOS.—Your general plan seems excellent. We do not see that any modification is necessary.

E. H. MORON (St. Thomas's).—In subsequent numbers to that referred to in your letter you will have seen all that has been published on the subject. Modifications of tone, rather than differences of colour, are produced. We shall have pleasure in hearing from you at any time.

HENRY MORTON.—Precipitate oxide of silver by adding caustic potash to a solution of nitrate, until there is no more precipitate. Wash well the brown precipitate obtained, which is oxide of silver, ready for application to the bath. It is best freshly precipitated. 2. It is difficult to tell whether you had an adulterated sample of gold, or whether the fault was in your acetate or manipulation. As a rule, one grain of chloride of gold will tone easily from one to two sheets of paper. 3. A solution of pyrogallic acid, with citric acid, ought not to discolour in ten minutes, unless it came into contact with something which decomposed it. 4. Acetic acid, which retained its proper colour until the bottle was opened, and turned orange colour afterwards, *must* have come into contact with some foreign substance. We regret that we cannot help you in cases all the details of which we are not familiar with. 4. The width of your room, 6 ft. 3 in., is scarcely enough for successful and convenient working, but we shall be glad to hear further from you when you have tried the working.

PARVIS.—We will ask the gentleman to whom you refer if we may communicate his address.

A. G. GRANT.—We shall be glad to see a description of your travelling studio. You will find a form with the fullest instructions for filling up on p. 397 of our 6th volume. The print is very vigorous.

JACK THE GIANT KILLER.—A glass-room 12 feet long will be short for card pictures. The shortest focus you can with propriety use will require from 12 to 14 feet between the lens and sitter. When you take groups the distance must be greater; and you should have at least 4 feet more for the camera stand, operator, and distance of the sitter from the background. You do not enclose the plan which you ask us to correct. You will find designs and instructions in our recently-issued YEAR-BOOK.

LUCEM, Aberdeen.—The especial advantage of the application of the solution of iodine 1 grain, iodide of potassium 2 grains, water 1 ounce, is, that it facilitates the operation of intensifying without much risk of fog or universal deposit. There is no risk of stains, if care be used. The solution may at times be used considerably more diluted with advantage. Intensifying goes on rapidly after it, and it is necessary to be careful not to go too far. In all cases where intensifying after fixing is practised, it is desirable to give full exposure. The iodine solution keeps any length of time. You make a stronger solution, and dilute for use. We are glad to learn that you have found a plan of getting more side light, and that it succeeds. We have pleasure at all times in helping our readers; and it is, of course, pleasant to know that our aid is found so satisfactory.

J. A. L., Bath.—The chief difference between the triple and orthoscopic is, that the former is quite free from distortion, and the latter gives curved lines. 2. We believe the lenses of both makers are good. As a rule, the best lenses are highest in price, and conversely. 3. We do not know of any one who is in the habit of purchasing negatives; but it is probable that some of the large publishers will generally be open to purchase anything likely to please the public.

H. P.—We prefer No. 2 in your list. See answer above on question of price. We could not, with any propriety, open our columns to a letter on the subject you name. So far as we know, the lenses of which you complain are good at the price.

M. ANGELO HALF PLATE.—Different theories have been propounded: our solution of the phenomenon is one based on the tendency to aggregation, always witnessed in the process of development. The free nitrate is most readily deposited on that part on which light has acted most, and in certain conditions it is attracted to that part on which light has acted in an excessive degree, which obtains more than its share from the part immediately adjoining it of the free silver, thus giving a line or margin of excessive density in immediate contact with a deep shadow. 2. Any accident to the skylight to which you refer, which would render necessary a thorough cleansing, or even entire renewing, would do great service. Seriously, the gallery is very dingy, and the skylight very dirty. It seems one of the "windows which exclude the light," to which Gray refers, only it lacks the "richness."

J. A. F.—Your letter is forwarded.

THE USE OF HOT WATER FOR WASHING PRINTS.—We have received some communications, with examples, on this subject, which shall appear in our next.

THE TWOPENNY PIRACIES.—Several communications received on this subject shall receive attention in our next.

PHOTOGRAPHY AND THE POETS.—Several of our readers have responded to Mr. Robinson's suggestion, and have forwarded to us quotations, which appear to have allusion more or less direct to photography. They shall appear shortly, duly arranged.

E. ALDIS.—Received.

Several Correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already acknowledged	277	19	8
T. Le Beau, Esq., London	1	1	0
J. Sander, Esq., London	0	7	6
Jas. Valentine, Esq., Dundee	0	10	0
A few Bradford Amateurs	1	15	0
James Magill, Esq., Belfast	0	5	0
C. Elton, Esq., Combe, Sydenham	0	5	0
W. Jeffreys, Esq., London	1	1	0
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J. S. Dismore, Esq., Liverpool	0	10	6
R. Boning, Esq., London	0	10	0
F. Sutton, Esq., Norwich	1	0	0
J. P. Gassiott, Esq., F.R.S.	5	5	0
W. Savage, Esq., Winchester	0	5	0
M. Guttenberg, Esq., Stockton	1	1	0
J. C.	0	2	6
Elizabeth Huggins	1	1	0
John Bocket, Esq., London	0	2	6
M. and B.	1	1	0
Clericus	0	2	6
J. Jakeway, Esq.	0	2	6
Photo	0	2	6
Messrs. Carter and Wilks, London	0	2	6
T. R.	0	0	6
T. Perry, Esq., Sheffield	1	1	0
H. Bath, Esq., Swansea	1	1	0
Collected by E. Brace, Esq.:— £ s. d.			
John Stuart, Esq., Glasgow 2 2 0			
James Bowman, Esq., Glasgow 2 2 0			
A Glasgow Photographer 2 2 0			
John Spencer, Esq., Glasgow 2 2 0			
John Kibble, Esq., Glasgow 1 1 0			
E. Brace, Esq., Glasgow 1 1 0			
A. Robertson, Esq., Glasgow 1 1 0			
Messrs. White, Brothers, Glasgow ... 1 1 0			
J. Douglass, Esq., Glasgow 1 1 0			
A Lover of the Art, Glasgow 1 1 0			
	14	14	0
T. Hearn, Esq.	1	1	0
C. H. Elt, Esq.	0	5	0
	£314	0	2

Photographs Registered during the Past Week.

MR. GEORGE SEAGER, 90, Oxford Street, Swansea,
Photograph of Rev. David Thomas.

MR. W. FOX, Sandbach,
Two Photographs of Rev. J. Gutteridge.
One ditto, entitled, "Rest and be Thankful."

MR. C. R. LOBB, Wadebridge, Cornwall,
Photograph of St. Knighten's Keeve Waterfall, Cornwall.

MESSRS. JOHN AND WILLIAM CHAPLIN, Guildford,
Stereograph of Martin F. Tupper and his family.

MR. JAMES T. WIGNEY, Ramsden Street, Huddersfield,
Two Photographs of Dr. Fearnley.

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 286.—*February* 26, 1864.

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ESTIMATING CHLORIDE OF GOLD.

In a recent article we gave a simple method whereby photographers might test for themselves the purity of their chloride of gold, without rendering it unfit for photographic use. A contemporary writer—who has recently been placing the "principal photographic chemists in London" under one common ban, attempting to prove, by an oddly-drawn average, that, as a body, they sell false quantities, and charge an iniquitous profit—seems unwilling that photographers should possess any such simple method of verifying his assertions, and denies the efficiency of this test, "for reasons which it is unnecessary to explain." He states that it was quite to be anticipated that "some attempt to apologize" for the enormities he had disclosed would be made; and he further adds, in reference to our allusion to his calculations as singular and unfair, that "before using the last term we might have taken the trouble to prove them so."

Now, if any of our remarks on the subject can be construed into an apology for fraudulent samples of chloride of gold, or for dishonest dealers, we have most lamentably failed in expressing our meaning. The subject, introduced with so much circumstance by our contemporary, is, we regret to say, no novelty. The vendition of adulterated chloride of gold, and of bottles containing short weight, has been more than once exposed and denounced in our own pages. Apology from us for such practices is out of the question; our object in providing a simple test was to enable our readers to detect fraud, and thus not only protect themselves, but make that distinction between dishonest and honest dealers which the writer in question seems to ignore. But in regard to our use of the term *unfair*, as applied to the calculations and deductions to which we refer, we are perfectly willing to justify it. The whole tenor of the remarks in question we regard as alike unfair to the consumer and honest manufacturer, for several reasons.

It is unfair to the manufacturer, because it deducts a part from the full weight given by the honest trader to add to the short weight of the fraudulent dealer, to form an average which shall tell against the whole. Of course this is the mode of obtaining an average, but the statement of an average at all, for such a purpose, is unfair. This is punishing the innocent for the guilty, with a vengeance. We will suppose, for a moment, the writer in question to be a schoolmaster, and that he has given to each boy, in a class of ten, one hundred lines of Virgil to translate. Five of these boys perform their full duty, and five com · short; translating, we will say, only fifty lines each. Will he at once strike an average, saying one thousand lines were due, seven-hundred and fifty are received, and proceed at once to administer a caning to each boy, until an equivalent punishment for the average defalcation of twenty-five lines each boy shall have been distributed? Possibly, if he did not know the defaulters, it might be alleged that such rough justice might be tolerated. But in the case to which we refer, the writer did know, or had means of knowing from whom he purchased every tube, three of which are admitted to have contained more than the usually guaranteed quantity of pure gold.

It is unfair to the consumer, because, knowing that some samples were honest, the writer of the article insists on the average dishonesty, planting a suspicion in the mind of the consumer which must extend to every manufacturer, whilst the only remedy given to the photographer is to manufacture his own chloride—an operation which, notwithstanding its simplicity, will not be attempted, we venture to say, by 50 per cent. of the photographic fraternity; and, when attempted, will not always be unattended with loss and accident, as we have good reason to know from the communications of correspondents.

It is altogether unfair to the manufacturer, and therefore to the consumer, by misleading him, in its statement of profit. In the first place, the cost is calculated, after a fashion, upon a half-crown tube, which is then contrasted with half-a-guinea's worth made at home. Now, we submit that, if a comparison were made at all, it should have been between the quantity obtained for equal sums of money. We find, on consulting price lists, that the photographer who expends twelve shillings will obtain a proportion of about 25 per cent. more gold than he who expends half-a-crown. Thus, if even the cost and profit were correctly stated, the comparison is an unfair one. But they are very far from correctly stated. In the first place, in attacking the profits of manufacturers, it is manifestly unfair to calculate them upon the fallacious average to which we have referred. The calculation for profit ought to be based upon a fair honest sample; and if then the writer feel it necessary to add the amount of deficit, he may state the two amounts, as so much for acknowledged profit, *and so much for robbery*. Again, he refers to the difference between the cost of production and the highest retail price as manufacturers' profit. Now, we need not tell the youngest of our readers that the difference between the cost of any raw material and the retail price at which a manufactured article reaches the public does not represent manufacturers' profit. It represents, besides the cost of labour, and the use and wear and tear of plant, apparatus, &c., the profit of the manufacturer, the profit of the wholesale dealer, and the profit of the retail dealer. It may be urged that the dealers in question were, or alleged themselves to be, manufacturers. That does not alter the case. Whatever they were, they were bound, by the etiquette of trade, to sell a single tube at the price at which dealers who purchase of them would sell it.

We are not now to discuss the wide question of commercial economics, as to the legitimate extent to which profits of middlemen and dealers should enhance the orginal cost of

an article. We wish simply to state certain facts. Let us endeavour to give an approximate estimate of the real cost and profit. Respectable dealers generally guarantee each tube to contain seven grains of metallic gold, which, at the standard price of pure gold, are worth about fifteen pence. Manufacturers state that it is found in practice that, owing to the presence of traces of contamination in the best samples of gold, inevitable, although infinitesimal waste occurs; and that in making up 15 grains of chloride of gold, which can be guaranteed to contain 7 grains of metallic gold, an expenditure of nearly 8 grains is necessary; that, in short, the gold in each tube costs about seventeen pence. If we take an average between the two sums, we may assume that the gold in each honest 15-grain tube cost sixteen pence. To this is to be added labour, acids, tubes, labels, use and wear and tear of apparatus, share of rent, and general business expenses — bringing each 15-grain tube, on a very moderate calculation, to a cost of about eighteen pence. Here, then, is one shilling left, not for manufacturers' profit, as we shall show, but for manufacturers' profit, and dealers' (one or more) profit and expenses. We believe we violate no trade secrets when we state how this is generally divided: 15-grain tubes of chloride of gold, guaranteed to contain 7 grains each of pure gold, are sold to the dealer for 22s. per dozen, with, under some circumstances, further discounts, which, for very large orders, reduce the price to the rate of twenty shillings per dozen. This makes the manufacturers' profit, if our calculation of cost be correct, from 2d. to 4d., instead of the seventeen pence stated by the writer in question. From 8d. to 10d. is left for the profit and expenses of distribution, amongst which we may properly include advertising, of the wholesale and retail dealer. Let it be remembered, moreover, that photographers who consume large quantities do not buy single 15-grain tubes, and that there are dealers who sell these for less than half-a-crown.

It is no part of our duty to inquire whether the proportion of profit be trifling or exorbitant, but simply to state facts and leave photographers to draw their own conclusions. Neither do we in the slightest degree deprecate photographers preparing their own chloride of gold. The operation is not difficult, and they will unquestionably save the amount to be otherwise necessarily paid for labour and profit. But let the matter be rightly understood. A certain sum must be paid for labour and profit on all manufactured articles. The cost of labour and profit on collodion is still greater than on chloride of gold, upon pyro-gallic acid greater still. Photographers skilled in chemical manipulations may save by preparing many things for themselves. But let them not forget that the profit and payment for labour in taking photographs is still greater than that on the manufacture of chemicals, and let them not waste time which might be expended in securing the greater profit, in order to save the money expended in the less profit.

One word on the simple method of testing chloride of gold, which we proposed. The writer in question says it is "for reasons, which it is unnecessary to explain" in his columns, "unreliable." We venture to think it was very necessary to explain the reasons upon which he based his statement, in order that his readers might judge to what extent they were cogent, and in what respect the method proposed is "unreliable." We do not dogmatize upon a test which, until we proposed it, had not been tried, and the action of which might possibly be modified by unexpected circumstances. In a multiplicity of trials, however, with chloride of gold, aurochloride of sodium, and mixtures of this salt with chloride of sodium under various conditions, it has succeeded perfectly. We have prepared mixtures of chloride of gold and chloride of sodium ourselves, and we have tried samples sold commercially as such mixtures with unfailing success. We have before us a letter from an able chemist, who says, "I find your plan to succeed perfectly. I have dissolved a mixture of the double chloride of gold and sodium, and with a declared excess of an equal weight of chloride of sodium. The whole of the double chloride was taken up, and a residue of free chloride of sodium left, weighing 48 per cent. of the whole amount. This was 2 per cent, less than I calculated on getting. I, therefore, in order to prove that your test was a proper one, and not fallible with such a compound, analyzed the double salt, and found it to contain the 2 per cent. excess of chloride of gold. This fifteen-grain tube contained 7·95 grains of pure gold." We publish on another page a letter from a well-known chemist and respectable manufacturer of a mixture of neutral chloride of gold and sodium, in which, whilst agreeing with us generally, he states that alcohol does not readily dissolve out the whole of the gold from his preparation. The reason at first alleged is, that a portion of the gold is possibly in the form of a protochloride. If this be the reason, it would simply imply that a portion of the gold is in a form useless to the photographer, as the protochloride is insoluble in water. In a postscript he adds, that further experiment convinces him that it is the condition of dryness and neutrality which renders the gold salt not readily soluble in alcohol. If this be so, the addition of a single drop of hydrochloric acid to any sample of such a salt to be tested, will render it readily soluble in alcohol, and therefore easily tested. But we incline to believe that it is really due to the formation of a portion of protochloride, which is very easily done in the process of drying, that such samples are slow to dissolve, for this reason: Amongst other examples we have tested such a salt, perfectly dry and neutral, in the form of a reddish brown powder. After digesting for a short time with absolute alcohol, and obtaining a deep-coloured solution of chloride of gold, we had still an undissolved copious reddish-brown precipitate. A portion of this was removed and treated with water, which at once dissolved a great part, giving a very nearly colourless solution of chloride of sodium, but leaving an orange residue, which remained undissolved at the expiration of thirty hours. This dissolved in a few seconds on the application of one or two drops of hydrochloric acid; it was, doubtless, protochloride of gold. The addition of a single drop of hydrochloric acid to the remaining residue, followed by absolute alcohol, at once dissolved out the chloride of gold, leaving the white residue of chloride of sodium intact, thus confirming our conclusion as to the cause of insolubility.

Notwithstanding the asseverated high character of the chemists from whom the writer in question purchased his fraudulent samples, we should be sorry if the faith of photographers in the honesty of their manufacturing chemists was destroyed, as they must rely upon such chemists for many of the preparations they cannot manufacture for themselves; and those who will cheat them in one thing, will do so in another. Errors and accidents excepted, we believe their trust will generally be well placed. In speaking of the reputed respectability of the dishonest traders he describes, it is important to get his definition of *respectability*. In our opinion, respectability includes honesty. In a certain trial for murder, one of the witnesses called to speak to character, referred to the murderer as a "respectable man." On cross-examination, the witness stated his idea of what constituted respectability to be:—"keeping a gig." Possibly the writer in question has similar notions.

WASHING PRINTS IN HOT WATER.

A correspondent recently sent us the two halves of a print one of which had been ruined by a final washing in hot water. In a note to his communication,* we suggested that the use of hot water had merely hastened an inevitable decomposition, and anticipated the effect of time. The print either still contained within its texture hyposulphite of silver and hyposulphite of soda, or, more probably, these combined with an organic salt of silver formed with the size of the paper. The application of heat produced decomposi-

* See p. 83.

tion as indicated by the "offensive smell," to which our correspondent referred.

It should be remembered, however, that a perfectly-fixed print will not be injured by immersion in hot water. Even if placed in hot water immediately on removal from the hypo-fixing bath, the only result will be a considerable reduction of the print as regards depth; the hyposulphite solution held by the paper being rendered more active by heat; but there should be no decomposition. When the characteristic offensive smell is perceived, either during the process of fixing or washing, the operator may at once conclude that something is wrong. His fixing solution is either old, weak, or acid, or the prints contained free nitrate of silver, and decomposition of the hyposulphite has been produced. It does sometimes happen that this result may follow when the fixing bath has been new, strong, or neutral, from some imperfection of the paper, whether putrid animal size, or decomposed albumen, &c., it is unnecessary here to inquire, as the circumstance is exceptional rather than customary.

Our present purpose is to enforce the fact that the use of heat in fixing washing is not only innocuous, but is, under some circumstances, desirable. Photographers know that on dissolving hyposulphite of soda in water a considerable fall in the temperature ensues; they also know that a low temperature generally retards chemical action. It has been pointed out by Mr. Maxwell Lyte that a very strong solution of hyposulphite of soda fails, in very cold weather, to fix prints. We wish to suggest then to photographers generally the importance of maintaining the fixing bath during extremely cold weather at a temperature of from 60° to 80° Fah., and of using warm water for washing either throughout the whole of the changes where it is convenient, or for the final wash. Mr. Blanchard informs us that throughout winter he uses water slightly warmed for all the stages of toning, fixing, and washing, with the greatest advantage. Mr. Cooper, in an article on another page, recommends the alternate use of cold and hot water. We have received communications from various professional photographers, stating their use of hot water with unfailing success. Mr. T. O. Rolph sends us a large number of choice specimens, perfect in tone, the whole of which have had a final bath of hot water, which he constantly uses. Mr. W. G. St. George, an old and able photographer and professional printer of much experience, also sends us a large print of fine tone and very pure whites, with the following communication:—

Dear Sir,—As a professional printer, I shall be happy to state my experiences in the use of "hot water" for washing prints after their removal from the fixing bath. My method is as follows:—Each change of water in the washing previous to toning is warm; toning and fixing baths the same temperature; when the prints are fixed, place them in a dish of water much warmer; pour that away; then you may fearlessly add the *boiling water* without the least deterioration of tone, and have the additional gratification of knowing that you have employed the proper means of removing the hypo from the fibres of the paper. I forward a print for your inspection, and think you will agree with me that the process has by no means destroyed the brilliancy of the picture. Hoping these hints may be of service to your correspondent, I am, yours faithfully,

W. Gregory St. George.

P.S.—I forgot to mention that after using the hot water I give the prints a further washing of seven or eight hours in running water. I know some will disagree with this prolonged washing, but I would rather err on the safest side.

W. G. St. G.

We believe that general experience will confirm the opinions we have given as to the value of hot water in washing; and where the tone is injured, it may generally be regarded as an indication of the prints having undergone partial sulphur toning, or containing a compound which must sooner or later decompose and cause fading.

Scientific Gossip.

New Blowpipe Flame for Spectrum Analysis—Physiological Action of Oxygen Gas—Dictionary of Solubilities.

Some interesting results have recently been obtained in spectrum analysis, which it will be of use for us to chronicle. In the examination of a mineral for alkaline and other bodies, which may give a spectrum reaction, traces of these substances are often overlooked on account of the difficulty of freeing the more volatile matters from the silicic acid, and other fixed bodies with which they may be associated. In Bunsen and Kirchhoff's original memoir, published in the *Philosophical Magazine* for August, 1860, they gave a rather tedious process for examining insoluble and refractory silicates. The mineral was to be powdered and digested with hydrofluoric acid, in a platinum dish. On evaporation, the residue is heated with sulphuric acid, and the dry mass dissolved in alcohol. The alcoholic extraction is then repeated, and, finally, the solid residue which remains after the alcohol is evaporated for the last time, is scraped on to the platinum wire, and examined in the spectroscope. It will be evident from the above description, that the process is a somewhat complicated one, and would not be often followed in laboratories, where some hundreds of such examinations had to be performed. In these cases, and generally whenever unknown minerals have to be examined in the spectroscope, it will be found a great security against overlooking any rare body, if the experimentalist adopts a plan lately proposed by Mr. E. J. Reynolds, and published by him before the Royal Dublin Society. In general, the flame of a Bunsen gas burner is the source of heat employed, but Mr. Reynolds strongly advocates the use of the simple hydrogen flame instead, on account of its more intense action on the bodies submitted to its influence, and the increased brilliancy of the spectra observed. A small apparatus, on the principle of the Döbereiner lamp, can easily be kept ready for use at a moment's notice, and the best form of jet is the shank of a common tobacco pipe. In examining refractory minerals, in order to obtain the characteristic spectra of the metals contained in them, a peculiar form of gas jet is recommended, which is essentially a Herapath's blowpipe jet, urged by a current of steam rendered acid by hydrochloric acid. The steam jet should never be so powerful as to blow the test specimen off the platinum wire; and by always keeping in readiness a small flask containing dilute hydrochloric acid, with properly fitted tubes, and supported immediately over the jet itself, the current could be made self sustaining, as in some blowpipe apparatus formerly in considerable use. Many advantages would attend this method of examination. There is no doubt that the rarer alkalies, if present at all, would be readily disentangled from the silicious and earthly matters, and would communicate their special system of lines to the flame; and this without any further trouble than that required to reduce the mineral to fine powder. By grinding up small fragments of a series of ores in an agate mortar, and testing them, one after the other, in the manner above described, a hundred or more spectrum analyses could be made in the same evening, and the results, whilst not quite so accurate as when obtained by Bunsen's method, would be of considerable value in pointing out what minerals were worth further examination. We have said that the results might not be quite so accurate as when obtained by the process quoted at the commencement of this article. The reason for this opinion is that the presence of chlorine or of hydrochloric acid in a flame containing an incandescent metallic vapour is liable to alter the character of the spectrum lines. It has been found that the chlorides give a slightly different system of lines from the oxides or metals themselves. In the ordinary way of observing, this is not so much noticed, as the other heated gases in the flame may be supposed to decompose the chlorides, and reduce most metallic compounds to their elementary state; but if an excess

of hydrochloric acid be present, we doubt if such decomposition will take place, and the unskilled observer will be liable to be led astray by the presence of other bright lines across the spectrum than he has been in the habit of observing when working in the ordinary manner. When this source of error is known, it will not be likely to lead to erroneous conclusions; but if not borne in mind, the observer will be liable to meet with more disappointment in adopting this new plan than can be counterbalanced by its accuracy in other respects.

We lately made some remarks respecting the easy and rapid preparation of pure oxygen gas, and its curative effects; suggesting at the same time that its physiological action would be a fertile field for experiment. We are glad to see that this subject has since been investigated by two French physicians, MM. Demarquay and Leconte. They have observed the very curious fact that nearly two litres of oxygen may be injected into the veins of a dog without killing it. When inhaled, they found that a dog could inspire thirty or forty litres with no other effects than putting him into good spirits, and creating a large appetite. Should the same effects be produced on human beings, what a blessing a few gallons of oxygen would be to a photographic tourist after a wearying day of failures! The respiration of oxygen also produces remarkable and beneficial effects on large wounds which were made in animals.

Photographers are constantly requiring information on the solubilities of the different chemicals they meet with. A most valuable work is now in course of publication in America, which will fill a void in this branch of chemical literature. The author, Mr. F. Storer, has in contemplation the ultimate publication of a complete dictionary of the solubilities, in different solvents, of every known chemical substance. The materials for such a work were found to accumulate so rapidly, and its ultimate completion required so much farther expenditure of time and experiment—for it was Mr. Storer's intention to compile materials from original sources until all the leading chemical publications of this century, at least, had been carefully searched and the collected items duly digested—that it was deemed advisable to print the matter already accumulated, in order to facilitate the completion of the projected work. The subject of the present remarks is, therefore, to be regarded in the light of outlines only, when completed, to be followed, at some distant interval, by a large and exhaustive dictionary of solubilities. At the commencement of an inquiry like the present the meaning of the term "solubility" has to be defined. The author here employs it in its most comprehensive sense, and many phenomena which fall but doubtfully under the category of true solution are included, it being considered that in the present state of science the collection of experimental data, and the study and comparison of well authenticated special observations, are of far greater importance than the question whether the phenomena in question should be referred to the domain of chemical affinity, or should be studied as a purely physical problem. Space will not now permit us to give any further account of this work, but we may perhaps recur to it again, and quote some instances of the solubilities of chemical substances of a more special photographic interest.

SOME NOTES

ON HOT WATER FOR PRINTS, AND THE ALKALINE GELATINE PROCESS.

BY H. COOPER, JUN.

IN the PHOTOGRAPHIC NEWS for the 12th inst., a correspondent, "W. A. S.," complains that, upon immersing photographic prints in scalding hot water, "an offensive smell is given off by the size, and the tone at once changes to a dirty yellow brown, which, however, improves a good deal on drying." As I have invariably used hot water for the final washing of prints for nearly three years, the record of my experience on that subject may not be unworthy a place by the side of many that will, I dare say, be received by the Editor of this journal. I find that if the whole of the hypo be removed from the prints before immersing them in the hot water, that very little or no variation will be observed in the tone; but that if *any hypo* remain in the tissues of the paper, or if the fixing bath be at all decomposed so as to cause sulphur toning in a slight degree, the print will be materially injured and a disagreeable smell will be given off, as noticed by "W. A. S."

The remarks of the Editor at the foot of the letter by "W. A. S." so exactly embody my own ideas as to the cause of the correspondent's failure, that I should not have included the subject amongst these notes if a wish had not been expressed to receive remarks on the action of boiling water on photographic prints. In the remarks referred to, it is said "that the finished prints were found to be slightly redder after immersion in the hot water than before."

Now, I must call particular attention to the fact that, in my practice, except in a few isolated instances, the tone is not altered *at all*. When it is made a little redder, I conclude that all the hypo was not removed before the immersion in the hot water. It is as well to give the prints a rinse in cold water before blotting them off; yet I think this is of no practical use except when any remaining hypo has been removed from the paper by the hot water.

As remarked in a paper on "Printing," read at the January meeting of the South London Society, I also always use water at a temperature of from 80° to 90°, and besides the comfort of its use this bitterly cold weather, for I heartily pity the poor printer who is obliged to keep his fingers in water just above the freezing point. I think that the hypo is much more rapidly eliminated from the paper than if water at so low a temperature be used, as if the remark be true that the greater the difference between the specific gravity of the solution in the fibres of the paper and the water in which it is immersed, the more rapidly will the hypo diffuse itself in the surrounding medium; the difference between the density of the hot and cold water will be sufficient to cause a great difference in the time required to get rid of our sulphurous enemy.

Theoretically, it would be an advantage to soak the prints alternately in hot and cold water, but whether there would be any practical value in this mode of treatment I cannot venture an opinion.

Alkaline Gelatine Process.—In the same number of the NEWS as the letter upon which the preceding note is founded, there is also one from Mr. Bartholomew, in which he says that the want of extreme sensitiveness in the alkaline gelatine process in my hands was caused by my having washed off the carbonate of soda, instead of allowing it to remain on the film. If he will again refer to the article mentioned by him, he will find that I there say that if the soda and gelatine be mixed together, great care is requisite to prevent a network formation at the lower part of the plate. I found that the washing off the carbonate conduced greatly to clean and easy working, and *did not increase the time of exposure required;* and the film is, I think, sufficiently alkaline for the employment of the ordinary developer. I have not yet tried an alkaline development with these plates, but should fancy, in that case, that the retention of free carbonate in the film might be an advantage.

By using the hot water for development, I have, since writing the paper in which the remark about "washing off" occurs, produced *portraits* with as short an exposure as with good bromo-iodized collodion and an iron developer. Some of the negatives were nearly free from fog, but, to my great annoyance, two or three out of the same batch have been completely veiled. I have also tried the expedient of thoroughly washing, after soaking in a solution of chloride of sodium or ammonium, then applying the carbonate, and only slightly washing before coating with gelatine, but without noticing any increase of sensitiveness. From Mr.

Bartholomew's letter it might be inferred that I found *no* increase of sensitiveness by the use of carbonate of soda in the gelatine process. This is not the fact, as a great diminution in the time of exposure was observed, although attended with considerable uncertainty as regards the quality of negative obtained.

Upon referring to my note-book for 1862, I find that the plain washed collodion is placed first, as regards sensitiveness, and the alkaline gelatine next, though on account of the drawbacks attending both, there are no marks of recommendation against them.

These remarks have exceeded so much the limits I intended, that I must defer the conclusion of "my notes" till another spare half-hour.

NEW SOLAR CAMERA, WITHOUT REFLECTOR.

PAR M. LIEBERT.

(*Mémoire presented to the Société Française de Photographie*).

In the month of June last, I had the honour of making a brief report to you on some photographic processes specially employed in America; and in a communication also slightly alluded to a new solar apparatus for enlarging proofs, according to a system which I had applied shortly before coming to France, the results of which have far exceeded my hopes. Since that date I have constructed several of these apparatus, and made all the improvements and changes that appeared to me necessary to render the instrument as simple and practicable as possible, with the aim of making myself useful to all my fellow photographers. With your permission, I will now explain the mechanism of this camera, and the advantages it possesses over other apparatus constructed for the same purpose.

The apparatus invented by Mr. Woodward is well known; it was the first applied to the enlarging of photographic pictures. I need not enter upon a description of it. Many modifications have been made in this first system by the opticians of different countries; some have suppressed the condenser, which they believed to be useless for lighting the proof to be printed. Others have contented themselves with merely rendering the reflector independent of the principal body of the apparatus, and of changing the gear which served to move it, so as to continually follow the various angles projected by the sun, according to its declination and diurnal motion.

Without attempting to decide what there is good or bad in these slight modifications effected in the fundamental apparatus, I shall only say that the principle is the same, as it consists in receiving the solar rays upon a mirror to be reflected, either upon a condenser, or directly upon the negative to be enlarged. The apparatus then remains fixed in a horizontal position, and it is this reflector which, receiving the luminous rays, projects them in the axis of the camera to depict the image upon a sheet of sensitized paper, placed upon a screen, in a place specially devoted to this kind of work, in the shutter of which the solar camera and its reflector is fixed. The new apparatus which I now have the honour of submitting to the society, like all the others, is based on the same principle as Woodward's, with this difference, however, the reflector is suppressed; it is the condenser that receives the luminous rays direct upon its axis, in the new arrangement I have given to this camera. This simple change, beside many other advantages which I shall enumerate further on, will permit the obtaining much greater sharpness than when a reflecting apparatus is used, in which first the reflector, then the apparatus carrying the objective and the negative, of small dimensions, intended to form the picture; and lastly, the screen upon the sensitized paper, being independent of each other, the least vibration, either in the floor or in the support of the principal apparatus, occasioned by the rattle of carts or other causes, inevitably multiply too highly the chances of *blur* upon the enlarged picture, whatever be the primitive sharpness of the negative. This defect is much more apparent the longer the picture is in printing. Now, in the new apparatus, which receives the solar rays direct, the light having a much greater intensity than when it is transmitted by a reflector, which absorbs a portion of the chemical rays of the light, the exposure is necessarily less. Again, the frame on which the sensitized paper is fixed before receiving the image, as well as all the other pieces of the apparatus, being dependent upon each other by their internal arrangement, no vibration or movement of the apparatus ever can have any effect on the final result, for all the movements are produced in the same direction, and produce the effect of the rolling of a ship at sea.

The suppression of the reflector, which is one of the causes of the rapidity with which my apparatus prints positives, is, nevertheless, not the only one. The principal is particularly the employment of an objective of very small dimensions, ¼-plate and even ⅛, which concentrates the solar rays upon the sensitized paper at a much shorter distance than objectives of larger dimensions, which we are in the habit of using; for the same reason, the image is more vigorous and the details fuller and sharper.

Moreover, it is to the application of this principle that I owe the solution of the problem, which, doubtless, more than one photographer besides myself has sought for, for I am convinced that many persons have already felt the advantage there will be in receiving the sun directly upon the condenser, instead of transmitting it by a reflector. I do not pretend to believe that I alone have had this idea. What I claim is only the first application of this problem, which, perhaps, other photographers have sought as I have done, but who, doubtless, have not yet found the solution from a cause which I shall endeavour to explain.

It is a generally received error that for an enlarging we must employ a large objective. This is why many persons, whatever kind of apparatus they employ, make use of an objective of three inches diameter and of short focus, or, at least, of a ½-plate objective. Besides, the distortion produced by these objectives, with very short focus—distortions which may be observed in every proof made with these apparatus—the considerable distance at which the sensitized paper must be placed from the enlarging objective to produce a picture of certain dimensions, do not permit of the construction of a camera under suitable, and especially practical, conditions, to make it follow the apparent motion of the sun, for the camera necessitates, for reasons which I shall explain, a drawing out of four or five yards, making of it an inconvenient instrument, neither portable nor manageable. The application of an objective of ¼ or ⅛-plate, which everybody believes to be unsuitable for this kind of work, is, on the contrary, that which fulfils the aim under the most useful and practical conditions, as it permits of the concentrating of the rays of the sun at a very short distance, while giving images of very large dimensions.

Another advantage possessed by this apparatus is the possibility of operating without interruption from sunrise to sunset, as it can be placed wherever desirable, and describe a circle of 360° if required, which can never take place with the reflector, demanding a special, extensive locality, very often difficult to obtain on account of the exigencies of the light, which we cannot always square with the arrangement of buildings in cities, and where the light must be received upon a moveable reflector; but, as in such case, the angular distance of the sun from the reflector is too great to be projected when the orb is at the two extremities of his course, the operation can only be performed when the sun is high in the heavens, and continues only three or four hours a day in the best season of the year.

This camera, by its combination, has been calculated to serve not only for the direct enlargement of pictures upon chloride paper, which require only to be toned and fixed like those printed in the pressure frame, but also for reproductions of all kinds which necessitate a camera of very long range

For that purpose, we have only to remove the condenser and put in its place a slide containing an objective (single lens) for views of the dimensions necessary to the size of the proof to be re-produced; in this case we remove the interior ¼-plate objective and the slide intended to receive the negative.

If we wish to produce large proofs direct upon collodion, it will also be very easy to adapt an objective of 5 or 6 inches, and to put the intermediate slides in the paper frame.

Lastly, I have not failed to avail myself of the facility with which we can print upon iodized paper, if this mode of operation be preferred, when the sun is visible for a few moments only, during bad weather: or still more when we have to take a collodion negative from a small transparent positive, for what can do the large can do the small.

The advantages of this apparatus may be summed up as follows:—

1st. A much greater rapidity in printing the positive picture.

2nd. An unquestionable superior sharpness which dispenses with retouching, when the negative is perfect.

3rd. No distortion in the positive picture.

4th. The suppression of an expensive locality, and one difficult to procure.

5th. The facility of operating without interruption during the whole time the sun is above the horizon.

6th. The cost being so moderate, that every photographer may make use of it for enlarging, as he can dispense with a large room intended for large proofs and reproductions.*

All these considerations permit of the production of pictures of large dimensions, at prices very much less than those at present demanded, besides leaving a larger remuneration to photographers, who make a special business of this branch of the art, so promising in its future, which has nevertheless remained stationary for some time past, in consequence of the numerous difficulties encountered in the use of the apparatus constructed for the purpose.

The tourist can now dispense with an enormous baggage when he wishes to obtain landscapes of large dimensions; since, in future, it will only be necessary for him to take ¼-plate negatives, and enlarge them with this new apparatus.

Far from seeking to make a mystery of the processes I employ to arrive at results not hitherto attained by my colleagues in photography, I make it a duty and a pleasure to publish my labours and researches; happy if this innovation, appreciated by the public, can effect a step in advance in an art I have practised ten years, and to which I devote much time and study.

In my treatise on Practical Photography, according to American processes, now in press, will be found a complete description of my apparatus, and the most suitable mode of operating for sensitizing the paper, toning the enlarged positive proofs, as well as the formulæ for a host of operations, little known in France, but practised with success on the other side of the Atlantic.

A represents a meniscus, or plano-convex lens, of great power, the diameter of which is in proportion to the dimensions of the pictures to be enlarged, and the form of the apparatus.

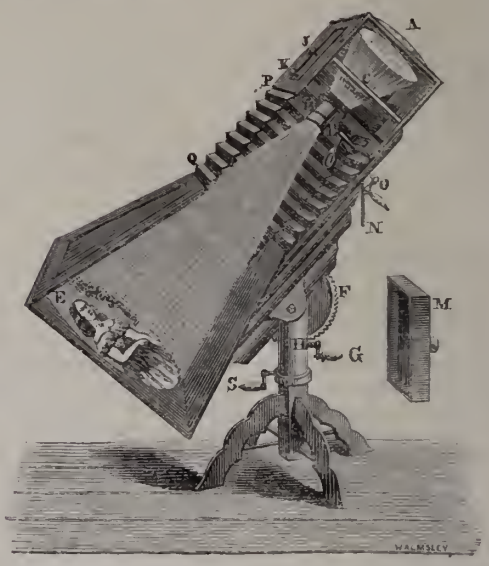
B is a double objective ¼-plate, of medium or of long focus, which can be replaced by an objective of ⅙, or ⅛, or ½, according as it is wished to enlarge more or less, in proportion to the distance of the sensitized paper, and the dimensions of the negative to be enlarged.

C is a frame containing the negative, D a small hinged shutter furnished with yellow glass, serving to watch the progress of the printing.

E, a frame with curtain or shutter, in which is placed the prepared paper for receiving the image; this frame is moveable, and is adapted to the extremity of the apparatus by means of a slide.

* The cost of this apparatus, giving proofs 18 by 24 inches, is advertised at 650 francs.

F represents a gear of cast-iron wheels, half circle, serving with the handle carrying an endless screw, G, to give such inclination to the instrument that the solar rays may always fall vertically upon the axis of the lens A, according to the declination of the sun.



H is the pivot stand, by means of which the entire apparatus may perform its rotary movement, which permits it to receive constantly the solar rays upon its axis, as the sun describes its circle in space. The screw handle, S, communicating with a circular gear of wheels contained in the stand, imparts a steady and equable motion to the apparatus during the operation.

J and K are two buttons communicating with interior screws, one serving to move the objective of the condenser A, and place it in its solar focus, the other, the frame containing the negative to be enlarged to put it in the focus of the objective; we can also focus the image with the screw of the objective L.

N is a string connected with a spring frame, furnished with tissue paper or ground glass, which may be interposed at pleasure before the objective, and observe the design while diffused light is allowed to penetrate, when we wish to watch the progress of the printing, by looking through the shutter D. The circular gear placed in the pivot stand to move the camera with, as well as the half-circle intended to impart the cradle motion, by means of which the sun can be constantly kept on the axis of the condenser A, on condition of moving them by the hand, may be replaced by a heliostat, which, with clockwork, will cause the apparatus to follow all the movements of the sun, without requiring to be touched; to that end it will only be necessary to regulate the heliostat when we wish to make use of it, according to the hour of the day and the declination of the sun.

I have constructed this camera of two different sizes, the one for giving positive pictures 18 × 24 inches, the other 24 × 36 inches as a maximum; these dimensions may be increased by increasing the other proportions.

When proceeding to enlarge a picture, the negative to be enlarged is first placed in the frame C, then the apparatus must be arranged by the handles G and S, so that the solar rays may fall upon its axis; the objective B will be placed in the focus of the condenser A, by making it advance or retire by turning the button K until the luminous circle is designed clear and sharp at the bottom of the apparatus; this may be seen through the shutter D; we can give the picture any dimensions desired by working the gear with the handle O, and afterwards retaining it in its place by a screw placed underneath. The image may then be put into the

focus of the objective, by working with the button J, the frame that supports the negative. These preparatory operations concluded, the frame is taken into the dark room, and the sheet of sensitized paper fixed upon it; the frame is then replaced, the shutter raised, the focus corrected, and it will only remain to keep the sun upon the condenser by means of the handles G and S, until the picture is printed; we can follow the progress of the printing by drawing out the button N, which corresponds to the frame covered with tissue paper, intended to observe the image while viewed through the little shutter D. The printed picture is carried into the operating room to be toned and fixed, like proofs taken in the pressure frame.

I conclude my rather long dissertation by proposing to whoever doubts the practical advantages of my apparatus, to make comparative trials with such other apparatus as he may desire to oppose to it, and then proving before an examining committee that the proofs I shall obtain will be at least as sharp, and without any more distortion, than those obtained by the apparatus opposed to it, and that in the lapse of a much shorter time of printing. I shall then leave to practical men the care of estimating the other advantages of this camera.

In support of what I now assert, I have the honour of submitting to the members of the society a portrait enlarged by me at Paris, in the month of December last, under the worst conditions of light that can exist, and when no other apparatus could work; it will prove, in the most conclusive manner, more than all reasoning, the advantages of this camera.

I much wish that there should be taken into account the unfavourable conditions under which I operated, and especially the negative with which I produced this proof, which is less vigorous than it would be with a stronger negative and a warmer sun.

Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting of the North London Photographic Association was held on the evening of Wednesday, Feb. 17th, Mr. G. Dawson in the chair.

The minutes of a former meeting having been read and confirmed, the following gentlemen were elected members of the society:—Messrs. G. Hitchcock, Elphinston Underwood, and W. H. Warner.

Mr. Warner exhibited a number of fine photographs of Welsh and other scenery, taken with the orthographic lens of Ross, the triple of Dallmeyer, and the aplanatic of Grubb. Especial attention was called to one by the latter lens, of 8¼ inches focus on a 12 by 10 plate, which, though dark at the corners, appeared to have a circle of light of about 12 inches.

In answer to the Chairman, as to whether he did not gain the increased field by placing the stop nearer to the lens,

Mr. Warner said it was so.* By so placing the stops he could increase the field of any single lens. For instance, he could make a Ross stereo lens of 6 inches focus cover a whole plate.

In answer to some questions as to some good enlargements he exhibited, Mr. Warner said he could not give further information than he had given in an article in the Photographic News some time ago. The only modification he had made, was in the lens. Mr. Harmer, he understood, used a Dallmeyer of short focus, whilst he preferred a lens of 10-inch focus. As to those on the table, the transparency was produced with a Ross's No. 2 card lens, and the negative from the transparency with a Dallmeyer's No. 2 triple. He used a 30-grain iron developer, without any acid.

Mr. Martin asked if he used no retarding agent at all.

Mr. Warner said none: its absence of course involved more care. For views generally, he used a 3-grain solution of iron. He had great faith in a weak developer for long exposures.

The Chairman said, in reference to the strong solution, it was probably used in cold weather, and with an acid bath or collodion.

Mr. Warner always modified his developer to suit varying circumstances.

The Chairman preferred to work with as small a quantity of acid as possible, but, as a rule, it would be impossible to work without any. In cold weather, or with decomposed collodion, or acid bath, very little acid was required in the developer.

Mr. Wharton Simpson exhibited some of Mr. Swan's new carbon prints, and made a few explanations regarding them (see p. 85). He also exhibited a very good specimen of Mr. Pouncy's process.

The Chairman said it appeared that the solution of the long-considered question as to the possibility of getting a perfect carbon process was attained at last. Without the most minute examination, it was impossible to distinguish these from silver prints, to which they seemed fully equal. They were unquestionably finer than anything he had seen in this direction. The one by Mr. Pouncy was very fine; but not equal to those of Mr. Swan.

After a desultory and conversational discussion on the subject, in which the prints received general admiration,

The Chairman called attention to some fine Indian photographs, by Mr. Underwood, taken at a time when the aid of bromides was but little known.

Mr. Simpson exhibited some very charming pictures by Mr. Annan, of Glasgow, with Dallmeyer's triple lenses, No. 1 and 4. One picture, 13 by 5, printed from two negatives, entitled "Willows by the Watercourses," was especially admired.

After a vote of thanks to Mr. Warner and Mr. Swan, and some routine business, the proceedings terminated.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, February 24th, 1864.

At a recent meeting of our Photographic Society, M. Arthur Chevalier, the eminent optician, exhibited an aluminium mounting for lenses, which recommended itself to the attention of photographers by its remarkable lightness, being, with respect to brass, as 25 is to 90, or nearly one-fourth, a serious consideration to travelling photographers. Aluminium has many other good qualities to recommend it besides its remarkable lightness, such as its silvery aspect, its freedom from tarnish, and its extreme hardness. Its price is about the same as silver; but as it is bulk for bulk four times as light, the cost of a mounting for a lens is not so high as to prohibit its general adoption.

M. Chevalier also exhibited his megascope for enlarging photographs. It is of very moderate price, and will give pictures magnified from five to fifteen times without distortion, and is equally applicable to portraits, landscapes, &c. There is no condenser in this instrument, and M. Chevalier prefers employing in the arrangement of the lenses a meniscus, with its concave side turned towards the negative. Instead of printing the enlarged picture on positive paper, it is recommended to take an enlarged negative on dry or wet collodion, and print from that in the ordinary way.

An interesting discussion on enlarging apparatus followed M. Chevalier's description of his instrument.

M. Bertsch reminded the society that eleven years ago he presented to the *Institut* a memoir, in which he established the rational conditions of lighting for the best projection of images, in order to produce, by means of photography, infinitely small objects with perfect definition. He also at that time presented proofs magnified from 200 to 1,800 diameters. Their sharpness astonished all those who were interested in the subject at that date.

This progress was due to a complete reform of the optical

* The effect exercised by the position of the stop on a single lens is too often forgotten. By bringing the stop close to the lens, the angle included is increased, but the field is much more curved. This, for some subjects, is not a disadvantage. In the 12×10 picture here shown, for instance, it consisted of the interior of an ironmonger's warehouse where the objects at each side of the room were accommodated to the curve of the field, thus securing the best effect for definition.—Ed.

system. He recognized, and put into practice, this principle, that notwithstanding the concentration of the light, it is necessary that it illuminates objects as if it came direct from infinity. The pencils must, consequently, be parallel with each other, and illuminate objects perpendicularly to their surface. As to what concerns more particularly the enlarging apparatus, he recognised at the same period that the picture is formed by the more or less varying extinctions of the solar rays. The principal focus of the system must be the point from whence commences the divergence of the pencils, the summits of which form the image. The light transmitted by diffusion from the points of the sky near the sun must be suppressed, because they furnish a second and less brilliant picture in the conjugate focus of the system. This picture, larger than the first, is the cause of much trouble. He, therefore, stopped it by means of a diaphragm placed at the point of the crossing of the rays, where the small image of the sun can be seen distinctly. M. Chevalier has adopted this diaphragm in constructing his megascope.

M. Bertch differed from M. Chevalier in thinking that we must have recourse to three lenses, and as many curved combinations, in order to suppress aberration. One properly constructed lens gives the same result, and although M. Bertsch has employed two in the instrument he referred to, it was because, desiring a short focus so as to be able to work in a limited space, he did not wish to make use of excessively curved surfaces. The photographic action being less absorbed by two lenses than by three. M. Bertsch thought that his humble instrument would bear comparison with the megascope.

Mr. Bertsch begged permission to say a few words on Dr. Van Monckhoven's solar camera. If the brief description he had read of it in the journals was correct, it appeared to him to be identical with the megascope. He had no doubt that his talented friend had considered the optical arrangement he had adopted as original. But M. Bertsch felt that he must remark that, upon the appearance of the American solar camera some three years ago, he drew a sketch, before the society, of the plan of an instrument which he considered to be preferable to Woodward's, as being more in conformity with the laws of optics.

This megascope is composed of a large condenser of crown glass, and of a flint negative lens, whose virtual focus is complementary to the first. This lens is intended to render the solar rays parallel, and to recombine them under the same conditions, as though they came from infinity. As in the analytic eye-piece, it nearly produces an achromatism, which gives more homogeneity to the field of light. However, persons familiar with optical questions, will recognise, that notwithstanding the superiority of the American apparatus, it is not exempt from imperfections. It is heavy, cumbersome, difficult to centre, and the operator must be endowed with considerable muscular power, to make the mirror follow the sun's course. It should also be added, that on account of the thickness of the lenses, which by their colour absorb the most actinic rays of the spectrum, and allow the calorific rays to pass, this apparatus is not quite free from danger to the negatives, which often break under the high temperature to which they are exposed.

M. Hermagis remarked that megascopes of small dimensions have the inconvenience of admitting the use of iodide of silver only: large instruments give a picture on chloride paper, in an hour and a-half.

To this M. Bertsch replied.—"That is true, but taking into account the difficulty of centering every ten seconds or so, to keep the sun's rays in the reflector, there is a great advantage in employing the small megascope, with which the picture disappears if the instrument is disturbed during the operation, but which is never uncentered. Experience has shown me that short exposure gives an infinitely sharper picture than a long one. I cannot see any advantage in employing means which demand two hours exposure to the light."

Upon M. Hermagis proposing a simple means of judging the difference in luminous intensity, by placing a thermometer near the negative, and seeing how high the mercury rose, this height to be compared with that shown by another instrument at a distance from the negative, the President, M. Regnault, remarked, that a great difference exists, between the thermometric and the luminous indications in a photographic point of view, because the heat resides specially in the red and yellow of the spectrum, and not in the blue portion.

M. Bertsch added that the calorific rays are not only useless but very injurious, and as the active rays are principally absorbed by the very material of the lighting apparatus, the advantages of large apparatus are more apparent than real, and, in his opinion, are more than compensated for by the difficulty of centering.

Upon M. Hermagis remarking that the condenser plays no part in the production of the image, M. Bertsch replied, that, on the contrary, its part is so important that if it be not achromatic the field of light will be like a series of concentric zones, some of which will contain infinitely less actinic light than others, and the objective will collect rays which will not all have the same convergence; some will even be divergent. Moreover, he had never seen sharp proofs obtained with chloride of silver, the reason of which is very simple. A negative, which appears to be a good one but which is actually a distorted one, is placed in the megascope. The distortions, scarcely perceptible in the small picture, become considerable in the enlarging, and the final result is very inferior to the small proof. Photographers, by constantly seeing them, become accustomed to these distortions, and the public, looking at them without analysing them, say nothing against them, but the critical eye can never tolerate them. "Speaking of distorted portraits, I wish to remark that we cannot obtain a portrait of a person as we see him with our eyes without employing an objective the aperture of which does not exceed the mean distance of the two pupils of our eyes. Large lenses produce very curious distortions. Some ten years ago, I was requested to take some portraits of our most celebrated *savants*, for a foreign publication, and as a specimen of what was required, some lithographic copies of photographic portraits were sent to me. I remarked in these lithographs an exaggerated development of the forehead. Phrenology was at that time in high favour, so in order that French celebrities should not suffer by comparison in respect to capacity of cranium, I employed in taking their portraits a Jamin's objective of six inches aperture. I masked the front lens by two bands of black paper, which, meeting at the base of the lens, expanded to the horizontal diameter, where they terminated. I was thus enabled to send portraits with Olympian brows, which had nothing to fear, phrenologically, by comparison with the specimen models."

M. Hermagis remarked, that if we consider the distortion to be in proportion to the diameter of the objective, it would be wrong, for a diaphragm is placed in the tube, which is not wider than the distance of the eyes apart. To this M. Bertsch replied, "That we must not confound a diaphragm with a stop. The first allows, if well placed, and of a correctly calculated diameter, all its aperture to the objective; the other, by suppressing the borders, makes the lens of smaller diameter."

The President remarked that the diaphragm played no other part than to stop the diffused rays.

This interesting discussion will enable the photographer to appreciate the merits of M. Liebert's new solar camera, without reflector, the description of which accompanies this.

NITRATE OF SODA IN THE PRINTING BATH, AND A CONTEMPORARY'S REVIEW.

Dear Sir,—The editor of a contemporary, in reviewing "The Universal Text-Book of Photography,"* says:—"We

* *British Journal*, February 15th.

regret to find a late printing novelty recommended—we mean the contamination of the paper sensitizing bath by the admixture with nitrate of soda. We have no doubt that the writer of that chapter would find it *very* difficult to prove the truth of the following statement which we extract, viz.: 'The addition of nitrate of soda prevents the albumen from becoming dissolved from the paper, as is sometimes the case. *It does not allow the solution to penetrate the body of the paper, thus keeping the print brilliantly on the surface;* and it enables a weak solution of nitrate of silver to be used to produce results equal to those of a stronger solution.'

Now, what your contemporary calls a "statement" is, in fact, *three statements;* the first and third of which, so far from being "*very* difficult to prove," can be easily verified by a mere child. With respect to the *first* statement, I, and many others, have invariably found that a five-grain solution of nitrate of silver *removes* the albumen from the paper, and that the mere addition of a large excess of nitrate of soda *prevents* its removal. The *second* statement I have put in italics, and shall not take any notice of, because, at present, I do not know anything myself upon that part of the subject. With respect to the *third* statement, a print cannot be obtained with a five-grain solution of nitrate of silver, and have the albumenized surface retained, but it *can be* by the addition of a large excess of nitrate of soda, and therefore, its addition certainly enables a weak bath to do what a stronger one can do without it.

The preceding quotation is strangely succeeded by the following words:—"Some experiments described by Mr. George Price, in a letter recently published in our contemporary, the News, are to the point with reference to this question." Now, the only one on the subject which I had then published, was that in your Journal for Jan. 22, p. 39, entitled, "A Few Words on Nitrate of Soda in the Printing Bath," and as *there are no "experiments described" by me with this mixed bath*, and strictly speaking, *none whatever are given in the letter*, I am totally at a loss to conceive, how by any possibility it can truly be said, to be "to the point," with reference to the statements upon which your contemporary was animadverting. I said nothing in it about the *effect* this mixed bath has upon albumenized paper, nor *anything* respecting its non-penetration of the paper; neither did I say aught about the effect produced upon a weak silver bath by the addition of nitrate of soda.

Curiously enough, I find Mr. Sutton has fallen into the same error, as the words I put in italics will show. In his "Photographic Notes" for February 15th, page 52, he says:—"With respect to the addition of nitrate of soda in the nitrate bath for printing, there seems to be a growing impression of its inutility. *Mr. Price has published an excellent article on this subject, and his experiments agree with our own.*" Whence comes this strange misconception of the purport of my letter by *both* of your contemporaries? It was written to show that the action of nitrate of soda was certainly "*incomprehensible*, in the present state of our knowledge of photographic chemistry;" and I pointed out that even the supposition of the formation of a double salt would not enable us to comprehend it any the better, as we should still have an excess of nitrate of soda in the solution; and a solution of this salt *by itself*—however strong it might be—would remove the albumen from the paper. As I had produced as good prints with a 20-grain bath as with an 80-grain one, *both without soda*, I said, "I had not *yet* been able to discover that the addition of soda was any improvement;" but I did not *condemn* this mixed bath, from this solitary fact, for *I was well aware that its originator was a keen observer of facts*, and, moreover, a long and dangerous illness had prevented my investigating the subject to my own satisfaction.

So far from there being "a growing impression" of the inutility of this addition to the printing, I believe it is daily growing in favour. However *incomprehensible a matter may be, it does not prevent its being a fact*, and however "unscientific" it may be, the evidence of my own senses tells me that quite as brilliant prints and fine tones—speaking *within* the mark—can be produced by the addition of a large excess of nitrate of soda to a weak silver bath, as can be produced by a strong one without it; however, prints obtained by the use of this mixed bath, when taken from the pressure frame, have their own *peculiar requirements*, and it is only therefore in *competent hands* that the full benefit of this bath is obtained.—Yours truly, George Price.

18, *Mornington Road, New Cross Road.*

MIXED CHLORIDES OF GOLD AND SODIUM.

Dear Sir,—The various photographic journals have for some time past teemed with articles and letters on chloride of gold. I have hitherto refrained from saying anything on the subject, lest I should seem to advocate unduly the claims of my own preparation of that article above others. I am tempted, however, to depart from that rule, through reading your leader and Mr. Price's letters on the subject. Your own remarks on commercial chloride of gold seem to me thoroughly fair and reasonable. You seem, however, to lean to the opinion that an excess of chloride of sodium over and above that necessary to form a double compound is an adulteration. There are, no doubt, makers who do thus victimise the public, but I apprehend that where the specific proportions of chloride of gold and chloride of sodium are distinctly mentioned on the label, as in my own case, the charge of adulteration could not apply. As the originator of the mixture of chloride of gold and chloride of sodium in equal parts, I trust you will allow me to explain why I introduced such an article into the market. Like my friend, Mr. Reynolds, of Leeds, I had often examined samples of chloride of gold in tubes, and found them exceedingly variable in composition. They mostly consisted of a mixture of chlorides of gold and sodium, with variable proportions of acid and water. They lacked the one thing necessary where formulas for toning solutions are handed from one person to another—namely, *definite composition*. It occurred to me, therefore, to manufacture an article which should be free from acid and moisture, and should contain a definite and easily-remembered proportion of chloride of gold—namely, one-half its weight. When we consider that the double salts (if they are such) of gold and alkaline chlorides, may vary considerably in value by not being rendered anhydrous, and that the so-called simple chloride of gold may, and generally does, consist of a compound of chloride of gold and hydrochloric acid, I think there is reason to wish for a more uniform substance, and one which is free from the nuisance of deliquescing so rapidly as pure chloride of gold.

I must, however, so far as my own preparation is concerned, object to your method of testing by alcohol, inasmuch as that agent will not readily dissolve all the chloride of gold out of my compound. I was not aware of this circumstance until your remarks induced me to try it, and I have not had sufficient time to make any further experiments on the subject. I suppose, however, that it is owing to the fact that a portion of the gold is in the form of protochloride. The preparation is not immediately soluble even in water, but the fact of its adaptability for toning is proved by the quantity which the photographic public have been pleased to use of it, amounting to some thousands of pounds' worth. Unfortunately, the rage for cheapness which seems to pervade even a scientific class—or, more probably, many of the dealers of whom they purchase their articles—stops the introduction of many an honest preparation. I have myself had orders to prepare a less genuine chloride of gold for a specific market, but they were not executed; and so close is competition in the matter, that, in order to obtain a sale for an article above the ordinary commercial average of quality, it must be sold in a wholesale way at almost a nominal profit. There are, however, many large dealers in photographic chemicals who do their best to supply first-class articles, and they do not, in the long-run, lose by it.

With reference to the question put by Mr. Price as to

whether aurochloride of sodium is a true double salt, I fear we must first have a definition of what a true double salt is. That a definite *double compound* is formed between chloride of sodium and chloride of gold is easily proved, and also one between chloride of gold and chloride of hydrogen (hydrochloric acid), but the proof of their being true double salts is, I fear, too long a matter for discussion in the compass of this letter.—I am, dear Sir, yours, &c.,

Francis Sutton.

P.S.—Since writing the above, I find that the difficulty with which my chloride of gold is dissolved by alcohol is not owing to the presence of protochloride of gold, but to the fact that when chloride of gold and sodium is rendered absolutely neutral and free from moisture, the salt ceases to be readily soluble in alcohol; even pure chloride of gold, when quite dry and neutral, is taken up very slowly. With respect to the testing for neutrality, it must, of course, be borne in mind that perfectly neutral chloride of gold reddens litmus paper. F. S.

[Our correspondent is in error in supposing that we regard chloride of sodium as an adulteration in a preparation sold as a mixture of the chlorides gold and sodium, provided the guaranteed amount of gold be present. This preparation is, no doubt, a convenient form of the salt for various purposes; and, we believe, in the hands of our correspondent, it is prepared with the strictest honesty. It is, however, a convenient form for adulteration in the hands of less scrupulous persons. If we met with a sample which did not yield to the test we have proposed, but left a portion of gold salt undissolved in alcohol, we should be disposed at once to suspect that a portion had been converted into a protochloride, a very easy thing in getting rid of the moisture; and as this is insoluble in water, it would, of course, be useless to the photographer. If, however, as our correspondent states, his preparation is rendered, by its dryness and neutrality, not *readily* soluble in alcohol, we should give it time; and unless the mode of preparation produces some special unanticipated effect, we should still hope, if necessary, to be able to separate the gold salt from that of sodium. Or, for test purposes, it would be easy to add previously a drop of hydrochloric acid, to destroy absolute dryness and neutrality.—Ed.]

Photographic Notes and Queries.

Nitrate of Soda.

Dear Sir,—In your number of the Photographic News of Feb. 4th, you explained the uses of nitrate of soda, by a correspondent. I beg to say I have tried the formula as laid down in the number before mentioned, and beg to thank the gentleman who instituted the inquiry for his pains, and the trouble he has taken to solve the question of weak silver baths for exciting purposes. The result of my trial, I think, is tolerably satisfactory. I enclose *carte* as evidence. It has not been rolled, or any means taken to increase its beauty. I simply followed out his formula. I would like your opinion. If I had a better lens it would, perhaps, have been better. What is your opinion of that print? Thanking you for past favours, I have the honour, &c. John Oxford.

New Meeting Street, Birmingham, Feb. 17th, 1864.

[The print is very vigorous.—Ed].

Solar Camera Arrangement for Winter.

Dear Sir,—It is written somewhere in an ancient book that we are to give honour to whom honour is due. In turning over the pages of last week's Photographic News my attention was arrested by a diagram of my own invention, and in perusing the article connected with it I saw the name of Mr. Sidney Smyth, the gentleman for whom I prepared the original sketch. Now, it may not be uninteresting to your readers to know how the matter came about. On the evening of a fine day some few weeks since I called on Mr. Smyth to see if he had done a 40-inch print that he had to do for me (as I could not then do one so large by artificial light), but have since perfected my apparatus to be enabled to print up to that size. I was congratulating him on the fine solar camera day, as we term it; he replied that the sun was too low to cover the disc. I immediately suggested the remedy in question, and in order that he should more fully comprehend the thing, I sent him a hasty sketch the day after, per post, of which the woodcut is a reversed copy. I also gave him full liberty to use my apparatus till such time as he could complete the arrangement I had suggested. These offers, I think, will at once show that no feeling of jealousy existed on my part that I now reclaim my design and ask for the insertion of this letter.—Yours respectfully, E. Aldis.

47, *Baker Street, W., Feb. 17th.*

Miscalled Cheapness.

Sir,—In your News, bearing date Feb. 6, 1864, is a leading article, which should at once set photographers thinking, and command with gratitude the thanks of every disciple of the *camera*—whether it be the "professional" with extensive business and large invested capital, or the more humble amateur, plodding in his attic or cellar—for dark room. Your article and *instructions* cannot fail being of inestimable value to him, as it not only points out a system of dishonesty, but also how to avoid some of the stumbling blocks which beset his pathway.

The practice of the art-science of photography is at the outset fraught with difficulty, but how much worse is that difficulty rendered when the poor tyro is *paying for that which he does not get*. Day after day of wearying toil and endless experiment is passed, in the vain hope of getting a picture. Surely, there must be something very fascinating in this art, to enable the amateur to bear up against the thousand disappointments to which he is subjected. Truly, some may have been placed in more favourable circumstances, when commencing their career in this line, but where *one* can be found so, a thousand instances may be cited of almost ceaseless troubles and endless disappointment.

The main question for *all* to consider is—amateurs especially, for they it is who squander the most money away without any return—*must it of necessity be so?* I think not. For, although I am bound to feel the great difficulty we *un*scientific beginners have to experience over the scientific, yet that is the greater reason why we need help and *honest dealing from those who take our money!*

Now, sir, permit me to suggest to my brethren to do what I have done: purchase your lenses from the best makers; next, get your chemicals from a house of *standing* and *reputation!* next, secure a *good* paper; and lastly, though not least, make up all your preparations *carefully*, and use them *cleanly!* and if you do not get a picture then, I am quite certain the fault rests with yourself. But pray, you do not think that the best *lens*, purest *chemicals*, and *finest* paper will produce the picture without the thoughtful capacity to *use* them: but one thing is quite certain, that if, with the *best materials*, you cannot succeed, how on earth can you hope to do so with those which are *cheap*, common, and worthless? And further, do not deceive yourselves with the idea that you will begin with *cheap* first, and when you have succeeded, that you will then buy better. This is the wrong end upwards, for no success can follow where *dishonesty* is the base, and this is equally true whether applied to morals or to science.

That it is *dishonest* to take the amateur's money, and give him a worthless article in return, requires no logic to prove. Then let your resolve at once be to drive these vampires out of the field, and let honest traders live, to reduce the practice of photography to its simplest condition, to save our money, our temper, and our time, and whilst photography is struggling to place itself in the ranks of the "Fine Arts," let it also be shown, that in its trading capacity it can at least be an honest one.—I am, sir, very respectfully, Q.

Miscellaneous.

Blackening the Brasswork of Lenses.—A correspondent of the *Scientific American*, referring to the process with bichloride of platinum, reprinted in that journal from our pages, says:—"Allow me to give you a process used by Mr. Alvan Clark, the distinguished telescope manufacturer. Old daguerreotype plates are to be dissolved in diluted nitric acid, and the articles to be coloured should be washed with this solution, previous to which operation they must have been heated nearly hot enough to melt soft solder, which last point is the only objectionable feature in the process. But it answers perfectly

for solid and hard-soldered work; and it is more convenient for most persons than the solution of bichloride of platinum, which is not always to be obtained. The inside of the tubes of optical instruments are, however, never blackened by any of these methods, but with a mixture of lamp-black and shellac varnish; in some instances, too, they are lined with black velvet, which is an excellent absorbent of light.

M. Niepce and the Royal Society.—We have noticed that it is not an uncommon thing in historical references to M. Niepce, one of the discoverers of photography, to speak of him as neglected, if not ill used, by the Royal Society. Glancing at a history of the art in the new photographic journal issued in Philadelphia, we find the same error thus dwelt upon. "In 1827, he (M. Niepce) visited England, and resided some time at Kew, cherishing the vain hope of attracting to his discovery the notice of the Royal Society, and even of the King. Scientific enthusiasm! Simplicity of heart! Delusion of the philosopher! Destitute of the pomp and prelude of fashion and fame, he remained unpatronized except by the curiosity of a few." The fact is, we believe, simply this: the Royal Society acted in accordance with a rule which they possess in common with all other scientific societies, that *secret* processes are inadmissible for their consideration or discussion. M. Niepce did not wish to disclose his secret, and declined, therefore, to comply with the rule which would have permitted the Society to examine his claims.

Disordered Nitrate Bath.—A correspondent describes a successful mode of dealing with a foggy bath, as follows:—"I again submitted half of the bath to neutralized sunlight for some days, when I again tried it, but still with streaky result, and fine deposit (after the iron) as before; I then tried the other half, but still no alteration. I then put one-half into a wide-mouthed glass bottle, with a little carbonate of soda, and placed it on the hob, near to the fire, occasionally shaking, when the solution became quite hot, and continued so the whole of Friday and Saturday; when I filtered it yesterday morning, and once more tried it, but this time with marked success, giving, without the addition of any nitric acid, a stainless and perfect picture, in addition to extraordinary sensitiveness. I then submitted the other half to the same treatment yesterday only, trying it this morning with the same success. I then mixed the two halves together, whose results were still perfect, and have taken over 30 double cartes with it to-day, all possessing the qualities of first-class negatives. There was a black deposit in the bottles, after making hot, which I conclude was the *devilment* of the bath thrown down.

The Newtonian Philosophy Overthrown.—The *Scientific American* contains a letter from an octogenarian philosopher, who proposes, in a course of six lectures, to overturn the whole of the received physical sciences. He proposes to establish the following propositions:—1. That light is matter. 2. That all matter is the recomposition of decomposed light. 3. That light consists of 161 distinct kinds of matter, perhaps more. 4. That Newton's 7 prismatic colours are true, and probably contain 14 more invisible rays, and perhaps 21 more invisible rays that cannot be detected. 5. That Newton's push, that set the great universe in motion, is not true. 6. That the two magnetic forces are the true cause of motion and stability, and the composition and decomposition of all matter. 7. That electricity is the true cause of all motion. 8. That the old Chaldean and Ptolemeyan philosophy, endorsed by Newton, and now taught in all the schools and colleges, is false. 9. That the sun is, in fact, as intensely cold as Newton rated him to be hot. 10. That cold, and not heat, is the natural state of matter. 11. That all heat is the result of friction. 12. That the magnet divided makes the galvanic and the electric forces, and they, united, make the magnet. 13. That the electric and galvanic forces are not a unit, but entirely different, performing different offices in the great universe, the solar system, and in the composition and decomposition of all animal and vegetable bodies. 14. That all matter, in whatever form of composition, is essentially alive. 15. That the two grand divisions of matter are into fluid and stationary. 16. That another grand division of matter is into male and female, and runs through all nature, and that all nature, in every department, goes into this pair, in some form accounting for all the sympathies and and antipathies of nature. 17. That when we find a pair, in any department, we find the whole. 18. That the undulation of light is false. 19. That Newton's centripetal and centrifugal forces are false, having no philosophical foundation.

The Changes of a Piece of Silver.—If we place a piece of pure silver in nitric acid, and add a proper quantity of water, the silver is dissolved as completely as sugar is in water, and wholly disappears; the solution looking exactly like pure water. If now we evaporate a portion and set the solution away, we shall find in the course of a few hours that the bottom of the vessel is covered with beautiful, white, flat plates, which are crystals of nitrate of silver, the metallic silver in combination with nitric acid. The nitrate of silver has some very singular properties. If kept free from contact with other substances, it may be exposed to the light for any length of time without any change from its pure white colour. Or it may be applied to cotton or the skin or hair in the dark without any change in colour. But if it is applied moist to any vegetable or animal substance and exposed to the light, it turns black in a few minutes. It is the colouring agent in indelible ink. If we place crystals of nitrate of silver in water, they are quickly dissolved, and if we throw a little table salt—the chloride of sodium—into the solution, the silver leaves the nitric acid, and combines with the chlorine in the salt, forming the chloride of silver. This is a white lustreless powder, and gradually turns black when exposed to the action of the light. Metals may be silvered cold by means of the chloride of silver. If we mix chloride of silver with carbonate of soda, and heat the mixture in a crucible to a very bright red, it is dissolved and both of the substances are decomposed. The chlorine leaves the silver and combines with the sodium of the soda, forming chloride of sodium—table salt—the carbonic acid escapes as a gas, and the silver is left in the metallic state in the bottom of the crucible. Thus we have silver first as a white solid metal, then a liquid like water, then in crystals like salt, then as indelible ink, then as a grey or black powder, and finally again as a metal. And these are only a very small part of the forms which it may be made to assume.

Talk in the Studio.

Photographs of Floods.—The *Melbourne Argus* of Dec. 17, referring to the disastrous floods just experienced in that city and surrounding districts, says:—"We have received from Messrs. Davies and Co. several photographs of the flood, which are worthy records of this memorable event. All are good, and one of the St. Kilda Road, at Prince's Bridge, is a perfect little gem. We have seen nothing in photography more happily truthful than the picture here given of the stream of water over the road, flowing smoothly from the left hand, looking from the bridge, the fallen rails here offering little impediment, and forming a very bank of water against the standing rails on the right. These photographs will, we imagine, be welcome to thousands who, within the last two days, have looked upon the scene they represent.

The Prince of Wales and Photography.—We are informed that Mr. Henry Squire had the honour of submitting to the attention of His Royal Highness the Prince of Wales, on Friday last, his new extra rapid card lens, and various photographs illustrating its capabilities, of which His Royal Highness graciously expressed his approval.

Art Photography.—We have recently received from Mr. Annan, of Glasgow, some charmingly artistic photographic landscapes. One of the most poetical photographs we have seen is a panoramic picture, 13 inches by 5 inches, entitled, "Willows by the Watercourses." The transparent water, the drooping willows, the wealth of marshmallows and other wild plants, &c., all combine to form a most charming composition, and the photography is faultless. It is admirably printed from two negatives by the No. 1 triple lens. "A Dell Without a Name" is another delightful sylvan nook. A large vignetted landscape, in which the principal feature is Melrose embowered in trees, is another very fine picture in which the delicate clouds aid materially in giving a perfect result.

Photography in Court.—We notice that photography begins to be generally recognised in our law courts as a witness that cannot lie. In a recent will case, photographs of alleged forged documents were handed to the jury for examination and comparison with genuine handwriting.

Medals of the Photographic Society of Scotland.—The committee appointed to make the awards at the competing exhibition of this society have just given in their report. We understand that a very fine collection of pictures was sent to the exhibition. We see with pleasure that Mr. H. P. Robinson,

of Leamington, has secured the highest position, having had the rare good fortune—or, perhaps, to speak more exactly, the rare merit—to secure two medals, carrying off the honours in two distinct branches of the art. Mr. Robinson has, we believe, on four previous occasions, taken prizes for pictures exhibited in the Scottish metropolis, and last year it was suggested that, as there were no other competitors in composition photography, it should be made a condition at the next competition, in order to extend the chances, that the medal for the best group should be given for a picture from one negative—thus excluding composition photographs from competitive exhibition. These conditions obtained, therefore, this year. Mr. Robinson has, however, again secured the prize for the best group, his "Somebody Coming," which we have before described, having obtained the silver medal. He has also received a silver medal for the best landscape, the charming view of Stoneleigh Deer Park securing the award. The other medals are awarded for pictures we have not seen, to Mr. John Moffat, of Edinburgh, for his portrait of George Harvey, R.S.A. a silver medal; to Mr. Thomas Rodger, of St. Andrews, for his portrait group of Colonel and Mrs. Maitland Dougal, a bronze medal; and to Mr. Francis Bedford for his view of Warwick Castle, a bronze medal. The Society have determined to distribute Mr. Robinson's "Somebody Coming" to the members as a presentation print.

CONSUMPTION OF PAPER.—It appears from the last trade returns that the consumption of foreign paper in England is considerably on the increase, 112,503 cwts. having been imported in the first eleven months of last year, against 92,288 cwts. in the corresponding period in 1862. Belgium supplies the largest quantity—no less than 61,950 cwts. out of the 112,503 cwts. having come from that country. In the eleven months ending November, 34,743 tons of rags used in the manufacture of paper reached the English market from abroad. It would be an interesting inquiry how much of the increase in imported paper is due to the very large consumption of French and German papers for photography, and how far it is necessary.

To Correspondents.

W. GREEN AND SON.—Your failure may be due to two or three causes, the most probable of which is the acids being too weak. If, however, you have carefully tested them, as you state, with the *specific gravity bottle*, we must presume that source of error to have been eliminated. Next, your temperature may have been too high. Are you certain that your thermometer registers correctly? Next, your cotton may not have been of good quality. Mr. Hardwich recommends that the cotton should always be boiled with dilute caustic potash to remove all resinous matter, the presence of which will sometimes cause complete solution of the cotton. In the samples of the finest carded cotton we have used, we have not found that precaution necessary; but it is possible it may be with yours. We have made pyroxyline for many gallons of collodion by the formula given in our YEAR-BOOK, and never met with a failure. Probably your best plan will be to try a larger proportion of sulphuric acid. Instead of using equal parts of nitric and sulphuric acids, try double the quantity of the latter, which will give you much less tendency to complete solution of the cotton. We commend your perseverance, and you will doubtless succeed.

P. M.—The spot is due to a defect in the paper. The firms mentioned in your list are all in good repute; but in the first list we have succeeded best with 1, 2, and 5; and in the second with 3 and 6.

A NEW SUBSCRIBER.—The quantity of alcohol required in a developing solution entirely depends upon the condition of the nitrate bath. With an old nitrate bath most operators like a little alcohol, say 20 drops to each ounce of solution. We very rarely use any. It plays no part whatever in developing, its sole purpose being to make the solution flow freely without running into greasy lines. 2. Yes, we believe so. 3. With an adaptor to make the camera long enough, it would doubtless answer satisfactorily.

J. O.—The price of the YEAR-BOOK OF PHOTOGRAPHY is One shilling.

VINCENT.—The application of a solution of pyrogallic acid and silver after fixing does not usually increase intensity very much. It is therefore used when only a slight increase is desired. A very slight additional deposit is obtained, but the colour of the deposit is made more non-actinic. In the case referred to, this method is adopted simply because a very slight amount of additional intensity is required. If a considerable addition were necessary, it would be desirable to apply a solution of iodine first. 2. The second named we prefer, as having the balance of good qualities.

T. P.—We do not know any bromide which is soluble in benzole. We fear you will find some difficulty in adding a bromide as you desire. Experiment will be the best mode of determining the matter. It is probable that bromine will be miscible with benzole.

A NEW SUBSCRIBER.—The modification proposed is not desirable for an inexperienced photographer. 2. We have not tried it; but it should be good from the repute of the maker. 3. Yes. Six inches focus will be best for general purposes. 4. We prefer the triple to the orthographne; and the No. 1 of the maker you name will, we believe, suit his "universal camera."

F. L. G.—If you carefully read our article in the YEAR-BOOK on "Glass-Houses," and the article on "Lighting the Sitter," to which you refer, you will, we think, be able to make the necessary application of the principles laid down to your own particular case. It is very difficult for us to advise with accuracy without a personal inspection of the position. You may use a subordinate high front light if necessary, as we have often stated. It is against the use of a principal front light we have always cautioned photographers. It was quite unnecessary for us to answer the article upon which you state you were expecting our comments. The "rudeness and vindictiveness" to which you refer only amused us; the "vagueness and want of clear thought and clear expression" are noticed and to some extent remedied, by the Editor in the same number, and after the remarks of his own Editor, it would have been cruel to add any remark. Besides, as we have never once mentioned the writer, and he could have only discovered any allusion to himself by some such process as that of *Scrub* in the play, when he says, "They must have talked of me, for they laughed consumedly," it was quite unnecessary to notice the attack. The statement that Mr. Rejlander has altered his glasshouse, to admit more front light, is all moonshine. He has not altered either the amount or position of his light. The only alteration he has made is the removal of a platform or dais, so as to remove the sitter further from his top and front light. This is construed by a writer "with a purpose" into increasing his front light. A cat's eye will aid in estimating the amount of illumination, but we see no reason for regarding it as a measure of actinism.

N. O.—Your difficulty is a legal one, and whatever our personal opinion of the merits of a case, we cannot venture to advise you on a point of law. The tenure of your engagement will depend entirely upon the nature of your agreement. As to signing an agreement which binds you to certain conditions, without binding your employer to anything, it is manifestly unfair.

D. DUNCAN.—Your communication is received with thanks. It shall have careful attention, and will probably appear shortly. The subject is interesting. The tones of the prints received are very similar to those obtained with the acetate bath. Let us have the formula.

HENRY MORTON.—We see no reason to believe that the gold was in fault. More probably the fault was in the acetate of soda. We believe that certain samples have a tendency to precipitate the gold, especially with the aid of heat. The black deposit to which you refer is probably metallic gold in powder. The addition of 40 grains of carbonate of soda to two or three grains of chloride of gold would be an effectual mode of precipitating the gold and spoiling the toning bath. Oxide of silver is not soluble in water. If applied dry, and in powder, the bath will require long digestion with it, with frequent agitation. Properly, it should be used freshly precipitated. We shall always gladly give you our best advice.

HENRY SAWYER.—You are certainly guilty of very great folly in supposing that any one should take the trouble to write to us in your name, for the purpose you suppose. We have not received any letter signed with your name, nor answered any such. The only explanation we can find for your error is an answer in a recent number to "Henry Sayers," a name which bears a slight resemblance to your own, although sufficiently different. A more careful reading would have saved you from a foolish suspicion, and an equally foolish charge against the profession in your neighbourhood.

P. P.—We scarcely understand what you mean by the negatives "treeing," unless you refer to the cracking of the varnish forming arboreseent or tree-like marks. It is difficult to decide the exact cause of this, but the most probable one is imperfect washing of the film after fixing, by which hygroscopic salts are left in the negative. Moisture is then absorbed in damp weather, and cracking ensues. The subject has been largely discussed and written about in the journals.

HENRICUS R.—In copying or enlarging, use the stop which gives you the best definition. Many skilful photographers find the full aperture of the No. 1 Triple give good definition in enlarging, but you must be guided by your subject and amount of light. If a large stop define sufficiently, the work will be more rapid; but don't sacrifice definition for time. 2. Specks in lenses are not unavoidable, and you will rarely perceive them in the lenses of the best makers. They are not, however, unless very large, of any detriment to the action of a lens. 3. They do not, as we have just said, act injuriously; but their presence is often an indication of carelessness or indifference in using imperfect glass, and should lead us to suspect a want of care in other more important points. Makers who are anxious to secure perfection in their instruments are scrupulous as to sending out the slightest blemish.

WILLIAM FOX.—"Rest and be Thankful" is a cleverly arranged picture. You should dedicate it to Earl Russell.

G. T.—Before condemning the lens for want of coincidence of chemical and visual focus, be careful to ascertain that the ground glass and sensitive plate occupy the same plane. In short, see that your camera is true. Unscrew the lens and measure carefully from flange to ground glass, then put in the dark slide with plate, and measure again. The distance should, of course, be the same.

An article on the Twopenny Piracies, Reviews of Mr. Bedford's Warwickshire Stereographs, &c., and some other matter, are compelled to stand over until our next.

THE GODDARD TESTIMONIAL FUND.—We have to acknowledge £5 5s. from R. L. C., through Mr. Claudet. The general list of further contributions stands over until our next. In a former list we acknowledged a contribution from "Elizabeth Huggins;" it should have been from "Mrs. E. Higgins," of Stamford.

PHOTOGRAPHY AND THE POETS.—We have to acknowledge several further quotations sent by several correspondents. It would facilitate our labours if our correspondents sending us classical quotations would add the translation; if from some recognized English translation, so much the better; as, to give the matter general interest, a translation should accompany the original text.

Several Correspondents in our next.

Photographs Registered during the Past Week.

MESSRS. SYMONDS AND WHEELER, West Cowes,
Four Photographs (from Oil Painting) of H.M. Queen Victoria.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of Joseph Watson, Esq.

MR. A. G. GRANT, Long Row, Nottingham.
Photograph of Rev. Robert Walker.

MR. A. S. WATSON, 2, Regent Road, Great Yarmouth,
Photograph of Stonewall Jackson.

MR. S. WALTERS, 3, Falkner Crescent, Bootle, near Liverpool,
Photograph of the American Ship, *Calhoun*, Riding out a Gale October 31st, 1863.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 287.—*March* 4, 1864.

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A SUGGESTION FOR PHOTOGRAPHIC ENGRAVING, WITH HALF-TONE.

In a recent number we published the details of M. Vial's exceedingly ingenious engraving, or etching, process, by which a drawing or engraving in greasy ink may be etched upon a steel plate in a few seconds. It is unnecessary to repeat the details of the process here; but it is important that the reader should be familiar with the principles upon which it is based, in order to see the bearing of our suggestion. M. Vial includes photographs amongst the pictures which his process is capable of reproducing; but, on referring to the method, it appeared that a lithographic transfer of the subject was necessary, and that the same want of half-tone which at present distinguished photolithographs would probably characterise the photographs reproduced by M. Vail's process. M. Joubert remarked upon this at the discussion at the Society of Arts, and pointed out that the intervention of photolithography was still necessary, and that a photographically engraved plate with proper half-tone was still a desideratum.

It appears to us that Mr. Pouncy's process will supply the want in that of M. Vial exactly. One of Mr. Pouncy's prints possesses all the qualities necessary to produce an engraved plate by the new process of etching, with perfect gradation of half-tone. The image is in greasy ink, like an engraving or print produced by the ordinary methods; it possesses the most perfect gradation possible in photography. It remains, then, for M. Vial to test his process with such a print, and produce a plate with the photographic half-tone duly rendered.

The question again arises as to how far the plate so etched will yield satisfactory proofs without a grain of some kind to constitute holding ground for the ink, and prevent it from being wiped away in cleaning the plate for each impression. This is a question which can, however, only be settled in practice, but the experiment is unquestionably worth trying

AN ART-CRITIC ON PHOTOGRAPHIC PORTRAITURE.

We always read with considerable interest the opinions of art-critics on photography. We know that these opinions must frequently be imperfect on many points, from lack of information; but, on the other hand, they often possess a freshness and originality that is very suggestive. A clever article in a recent number of the *Reader*, a portion of which we give in another page, reviewing a series of portraits by Mr. Wynfield, a painter of considerable merit, who has for some time past given some attention to the camera, possesses some points of astounding originality at which photographers will stand aghast, and some strictures upon photographs, regarding which, although of the old and cant character, we must offer one or two observations.

In the first place, photographers will learn with surprise that one of the chief causes of failure in photographic portraits, or rather, of their want of artistic qualities, is the fact that sitters have been required to remain motionless during the time of exposure. Mr. Wynfield, according to this critic—and we here beg Mr. Wynfield's pardon, for what we know of the real excellence of his works convinces us that he is in no wise answerable for the vagaries of his critic—has reformed this altogether, and he not only places his sitter out of focus, but instructs him to move during the exposure of the plate. But the critic shall speak for himself, so that any instruction to be derived from his golden maxims may not be marred by an imperfect rendering. He says:—

"Taught, by a true painter's instinct, that one of the greatest defects of ordinary photographic portraits is a hard and false realization, his first thoughts were given to the means by which it might be remedied. This difficulty he overcame in a characteristic way, by rejecting altogether one of the chief canons of the craft, which maintains the importance of immobility on the part of the sitter. Mr. Wynfield is not only careful to place his subject out of focus, but he directs him even to move slightly, so that all the lines and boundaries of his form shall be modified and softened. The most ugly feature of a photographic likeness is by these simple modifications entirely removed; and Mr. Wynfield is free to employ the resources of his own judgment and taste in the arrangement of his model."

Now, we fully admit that there is such a thing, with some faces, as having a picture too sharp. We know that nothing is more offensive to the artistic eye than a hard-lined, seared, wrinkled visage, rendered with a more than pre-Raphaelite faithfulness, as though it were cut out of a rock, the monochrome of the photograph giving an appearance of exaggeration to every wrinkle. Various modes of getting rid of this offensive sharpness have been suggested and tried, such as interposing some medium between the sitter and the lens, putting the image out of focus, &c. We have seen such attempts made, and have seen the portraits like Portia's, Dardanian wives—

> "With bleared visages, come forth to view,
> The issue of the exploit."

"Putting the subject out of focus" is unfortunately a very indefinite expression, and suggests, especially if a very perfectly corrected lens have been used, a still more indefinite result. If the tip of the nose be in focus, for instance, we may suppose the ears to be out, and *vice versâ*; if the focus be behind the figure, we shall have an elaborately sharp background, and the rest of the picture nowhere, and so on, wherever we may place the focus avoiding "the subject." It is true the judicious artist will avoid giving especial sharpness to a seamed or scarred face, by throwing the focus a little backward or forward, as circumstances may suggest,

so as to avoid crisp definition of the texture of the skin. Some also, for such cases, will use—and we confess to the heresy of applauding them—a lens possessing some positive spherical aberration, giving approximate definition everywhere and sharpness nowhere. But what shall we say of instructing the sitters to move? Does the critic know we wonder what movement in such a case means? Does he know that the lateral movement of one-eighth of an inch means the production of two pupils to the eye, two spots of light on the lustrous orb, in addition to the general confusion of outline, and destruction of expression? Our critic has, doubtless, a very correct appreciation of the result desirable to obtain, but he is hopelessly ignorant of the means whereby such a result may be produced.

In his strictures upon photographers and photographic portraits his remarks are equally wanting in judgment. In speaking of the "vulgarity, monotony, and poverty of resource" of photographic portraiture, he appears to have formed his opinion only upon the productions "which may be obtained for sixpence in the New Cut." He laments in photographic portraits the absence of distinction between a lady and her maid, between a statesman and a prize-fighter, between a poet and performer on the tight-rope. Now, we humbly submit that where Nature has made these distinctions, photography will render them; but we may also suggest, Lavater to the contrary notwithstanding, that Nature has been much more chary in making these outward distinctions than is very often assumed. We were recently present in an assembly of nearly a hundred persons, comprising men of the highest standing in intellect: poets and men of letters, painters and sculptors, peers of the realm and members of Parliament. A friend, who sat by our side, himself a novelist of some position, whispered to us, "Have you ever noticed, when a few scores of the intellects of the land meet, what a collection of common-place and ugly faces they make?" Without entirely endorsing this remark, we do affirm that these distinctions are neither so common nor so patent as our critic assumes. The painter, it is true, can add a factitious dignity to the one or an equally factitious vulgarity to another, but is he true in either case to either Nature or Art? But after complaining of the want of these distinctions in ordinary photographs, the mode in which it is stated Mr. Wynfield has got rid of the common-place is rich in the extreme. He has been photographing a series of painters. "These painters," the critic remarks, "comparatively ordinary in modern garb, appear as Venetian or Spanish nobles" in virtue of certain "mediæval costumes," which they have donned for the occasion. Now, without in the least finding fault with Mr. Wynfield's fancy for arraying his sitters in masquerade costume, we do affirm that it is the sublime of nonsense for a critic to complain of photographers for not understanding "treatment," and for the common-place character of their portraits of the general public, and then show that the only mode in which a recognised "artist" can confer dignity even upon men of mark in the world, in the nineteenth century, is by ransacking the chests of the costumier for the moth-eaten drapery of a bygone, but more picturesque, age.

THE TWOPENNY PIRACIES.

We have received several further communications on the subject of the twopenny piracies, discussing the best means of suppressing a practice so degrading to the art, and detrimental to its respectable adherents. Various cases are mentioned, in which the stamps forwarded have been confiscated, and neither the pirated copies obtained, nor answers to repeated letters of inquiry or remonstrance, and it is suggested that we should publish some cases of this kind. But this is scarcely to our purpose. With the honesty or dishonesty of these persons in carrying out their engagements with the public, we have very little concern here. Those who at any time seek bargains by the purchase of goods, whether photographs or flat irons, at a price manifestly below their market value, do it at their proper risk, and have but themselves to blame, if they waste their money. It may, it is true, aid the honest trader, if publicity be given to such cases, but a journal read by photographers is not the proper medium for warning the public. We have to deal with the steps possible to photographers, for the purpose of abating the nuisance, and it appears that the most efficient course is to familiarize the public mind with the necessary imperfections of a copy even in its best phase, whilst the twopenny piracies generally present it at its worst. A large portion of the public will readily appreciate the difference, when it is pointed out to them. A photographer of high standing recently related to us a conversation he had had with a customer who had ventured his half-crown, and actually had received his copies. He produced one of them with great disgust, as he confessed that he had been anxious to know what could be done for the price. Our informant described the copy as being above the average quality of such productions.

"My son," exclaimed the customer, as he scornfully surveyed the copy, "is a lively looking lad, with a clear bright eye, nothing like this dingy, blurred, half-blind looking thing! The originals cost me a shilling a piece; but they have eyes. I would rather have one of them than a cartload of this rubbish."

This, we apprehend, is the feeling which photographers have to encourage. Let them thoroughly convince the public of the superiority of the originals, and the demand for piracies will soon sink into an unremunerative condition, which will put an end to their production.

We have also received communications referring to the subject, but more especially bearing upon the tendency of some portraitists to injure the profession by a general tendency to reduction in prices. As we have always used our influence against the cry for cheapness in material or apparatus, as dangerous in its tendency and destructive of excellence, so we would deprecate a similar tendency in regard to photographs themselves. Into the detail of the subject we do not enter; but will allow our correspondents to speak for themselves. We append the letters of two of them:—

Sir,—In perusing in a recent Photographic News your pertinent remarks on the petty annoyances endured by photographic portraitists in having their works reproduced in a very questionable shape by those worst of rogues, the "Twopenny Pirates," I could not help thinking that there is still a greater evil in progress, which, alas! like the self-immolating heathen votaries of old, the photographic portraitists inflict upon themselves by their insane competition with regard to the prices of their productions. Is it not, sir, a sad thing to contemplate, that whilst the productions of respectable art-photographers are yearly becoming more and more valuable to the public by the increased appliances of labour, skill, and intelligence, yet, notwithstanding all this, the operator is exhausting his physical and mental powers at prices barely adequate to support the position he is entitled to? There is, sir, I fear, a sad future in prospect for the profession, unless a defensive combination is at once formed, in order that fair remunerative prices for cartes de visite and other photographic productions may be established and maintained. The public generally do not wish to cut down to "shirt-making prices" photographic works of art. It is the professors themselves who seem to be inspired with a suicidal and murderous spirit to work, not only their own ruin, but also that of their opponents.

A Professor who Keeps up his Prices.

Worthing, Feb. 16th, 1864.

Sir,—I have observed the letter of a "Lunatic," addressed to the Editor of the *Daily Telegraph*, and thought at the time of replying to it, because I could not conceive that any one but a "Lunatic" could expect to receive fifteen copies of cartes de visite for half-a-crown. I am glad you replied to the weak individual, and dwelt at length on the twopenny piracy, at the same time making known that the arch leader of this unremunerative business had become an absconding bankrupt—the common end of unscrupulous men. So much for pretended cheapness, which is incompatible with common honesty. With your permission I will draw your attention to another species of dis-

honest monopoly. I here refer to that class of portraitists who take the first copy for a shilling (woe be unto us), after-copies 6d. each—a price which can never pay, were photographers generally to adopt it, and most degrading to the art, retarding its progress and excluding a laudable ambition for excellency which is here out of the question.

How humiliating to think our valuable and beautiful art should be so degraded by scheming and unscrupulous men. "Live and let live" should be the motto of all men, but the shilling establishment can only pay by the wholesale monopoly of the trade of others, who, through their honest toil, seek to uphold the merits of their art—thereby staving off the universal bankruptcy which must inevitably follow competition upon unremunerative charges, by fair competition every man would stand upon his own merits, all would gain an honest living, and the public would be very much better served. This, sir, is the opinion of an old photographer, writing from this fair town of Brighton, which is, unfortunately, cursed with, besides its extreme radicals in politics, has its legion of over-cheap portrait establishments,—I am, sir,

Fair Play and No Favour.

We do not enter further in detail here than to deprecate generally the suicidal tendency of reckless competition. We shall be glad to hear the opinions of other correspondents on the subject.

THE EARLY PHOTOGRAPHS.

Mr. M. P. W. Boulton has published some further "Remarks" on the evidence upon which the early date of the photographs of Soho House was supposed to be established. As the information he supplies is important, we make the following extracts, which seem to establish the fact, that the metal plates are in all probability simply Daguerreotypes taken at a comparatively recent date. The mystery of the paper pictures is, however, in no wise cleared up.

Mr. Boulton says:—

I find that my contradiction of Price's statement, concerning the closure of the library was not sufficiently strong. My sister, who latterly was much more at Soho than I was, informs me, that during a considerable period of time, the cupboards in the library were frequently open, more often open than shut.

I find also that the portion of the library in question, called the back library (the room in which the camera, photographs, &c., were found), was used by Miss Wilkinson as her studio: and there can be no doubt that she had access to the cupboards in it.

Mr. Boulton adds some remarks reflecting strongly on the moral character of Mr. Price, which we do not think it necessary to reproduce. He adds, in justification of these strictures on Price's honesty:—

It is obvious that if I suppressed such circumstances, and allowed his testimony to enjoy the credit due to that of an upright person, I should myself be doing great wrong to the public, and to those who are now considered the inventors of photography.

With reference to the subject of the camera, I find that there were two cameras in the library at Soho; a camera obscura, and a camera lucida. Both were frequently used by Miss Wilkinson. She used the camera obscura for photography, properly so called (*i. e.*, for making pictures by means of a lens); but she used it far more frequently for making copies of objects by drawing. She prized it much as a very good instrument.

This camera was an old camera, and I do not know that it existed in the library in my grandfather's time, and was used by him.

For taking the photogenic drawings of the ferns, Miss Wilkinson used another and modern instrument: that which Mr. Stockdale says she called a helioscope.*

Miss Wilkinson knew nothing of photography before the publication of the discoveries of Daguerre and Talbot: but soon after this she received instructions in photography from two gentlemen resident in the neighbourhood, Mr. Murdoch and Mr. Alston. One or both of these gentlemen took photographs of Soho House. It appears that they made Daguerreotypes; and very likely obtained their metal plates from Soho; whence Daguerre at an early period obtained his plates. Of course, therefore, in the absence of proof to the contrary, it is perfectly open to suppose that the photographs on the metal plates were made by one of these gentlemen, given by him to Miss Wilkinson, and deposited by her in the library.*

I has been observed that I do not apparently dispute the evidence of the old man Townsend. But what is thus called his evidence rests solely on the authority of Price, who is quite capable of attributing to him statements which he never really made. Some of the statements ascribed to Townsend are known by me to be true, but these are not new: others are new; but the question is whether these are true, or whether they are inventions of Price.

Just in the same way it is doubtful whether the statements attributed to Miss Wilkinson were really made by her. If she knew that the plates were of the date alleged, it is exceedingly improbable that she would give them to Price, and very strange that she never mentioned them to myself and other members of the family.

Again, if photography were practised at Soho at the time in question, it is hardly possible that my father should have been ignorant of the fact. And if he knew of it, it is very strange that when the invention of photography was in everybody's mouth, he never mentioned the early practice of the art at Soho.

If clear evidence were adduced in proof of the fact alleged, all such difficulties would be of no account; but until this is done they must be seriously considered. They would present obstacles to the reception of Price's story, even if he bore a good character. Actually, however, he does not do so, having exhibited a flagrant want of moral principle. Under such circumstances his unsupported testimony carries no weight; and it would be irrational to accord credit to his statements except where they may be corroborated by evidence of a trustworthy kind.

His story has received some confirmation from the evidence of Dr. Lee, But this confirmation is obviously inconclusive, for while it may be admitted that pictures of Soho House before and after its alteration were taken by some peculiar process, it by no means follows that the photographs obtained from Price are the pictures so taken.

This point cannot be established unless some knowledge be obtained of what Soho House was like before the alteration.

Having procured from Mr. Smith a drawing of the photograph alleged to represent Soho House in its former state, I sent it to Mr. Zaccheus Walker, a gentleman residing near Soho, asking him both to compare it with houses in the neighbourhood, and to show it to any old persons who might be found capable of recollecting the former appearance of Soho House.

I am informed that at present no house has been discovered which the drawing can be supposed to represent.

Two old persons were found who professed to recollect the former appearance of Soho House, viz., Mrs Townsend, widow of the old man previously mentioned, and Samuel Vale, an old Soho workman. It is stated that Mrs. Townsend is eighty-five years old, and came to work at Soho when seven years old. Samuel Vale is said to be seventy-four years old.

From the testimony of these two persons it would seem that the alteration of the house took place either in 1794 or 1795. Mrs. Townsend at this time would be fifteen or sixteen years old; at which age she might have had a good and lasting knowledge of the appearance of the house.

It is asserted that when the drawing was shown to Mrs. Townsend, she declared it with much confidence to represent Soho House as she first recollected it. But on a subsequent examination she declared that Soha house before the alteration was *three stories high*, and that the windows on the ground floor were *round windows coming out from the wall* (*i.e.*, it may be presumed, bay windows). Such features do not in the least tally with those displayed in the photograph.

When the drawing was shown to Samuel Vale, he too asserted that it represented Soho House as he first remembered it; while on a second examination he too asserted that the house, before its alteration, was three stories high. Mr. Walker states it as his opinion that Samuel Vale has really no knowledge of the

* Mr. Smith conjectures that Miss Wilkinson most probably made her photographs by means of the *camera lucida*. Those who understand the nature of the camera lucida can appreciate the merit of this conjecture.

* It has been conjectured that the plates are by Niepce, but it is strongly against this supposition that one of them represents Soho House in its modern state, as is shown by features not yet effaced.

former appearauce of tho house"; nor, looking at his ago, cau this be wondered at.

At present, therefore, so far as I havo been able to ascertain, the ovidence needed to establish the antiqnity of the photographs on the metal plates is quito defective.

I have nrged Mr. Smith to send a drawing of the photograph to the gentlemen at Birmingham who commnnicated with him, in the hope that they may be able to find some other old persons capablo of giving evidenco on the subject.

I shall be very glad if it can be shown on good evidence that photography was successfully practised at Soho in tho last century; but I am wholly nnwilling that a belief to that effect should bo created by statemonts contrary to fact.

With respect to the "polygraphic" process, of which I take the *paper pictures* to bo specimens, tho theory which would identify it with the art now known as photography appears to me hopelessly untenablo. My belief is that it was in a great measuro mechanical, and that the titlo of "mechauical paintings" applied to its products was no misnomer. Had it not been for the statements of Dr. Lee and Mr. Hodgson, I should not havo supposed that the title of "sun pictures" had any legitimate application to the copies produced by this method; but the statements of those gentlemen would indicate that the agency of light played a noteworthy part in somo stage of this peculiar process.

It may bo that there were two distinct processes, ono mechanical, the other by sun-light, and that there has beeu confusion between the two. But I think it unwarrantablo to assume in the present state of the evidenco that two distinct methods of copying pictures were carried on at Soho.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Analysis, and Adulteration.

Lead Salts *(continued.)*—The combinations of lead with carbonic acid are among those which are most important commercially. When metallic lead is exposed conjointly to water and air, it becomes coated superficially with the dicarbonate, a compound of two atoms of oxide of lead and one of carbonic acid. This salt was at one time proposed as a pigment, but not having the requisite body, it soon fell into disuse.

The article known as white lead is also a combination of lead and carbonic acid, and is prepared on an enormous scale as a pigment. Many different processes are employed, but they all agree in principle, which is to expose metallic lead to the vapour of acetic acid, in an atmosphere loaded with carbonic acid, or in some cases finely ground lithage is ground up with an aqueous solution of one per cent. of sugar of lead, and the whole exposed to carbonic acid, with constant agitation. The acetate of lead introduced or formed at the commencement of the process has the property of dissolving oxide of lead, forming basic acetate. This dissolved oxide is then precipitated in the form of hydrated carbonate (sesqui basic) by the carbonic acid which it meets with. In a few days the lead is converted into white lead, which is then broken up by machinery and ground with water. White lead forms a white earthy, dense and heavy mass, which possesses greater coating power than any other white pigment. When diffused in water and examined by the microscope it is said by Hochstetter to consist of non-crystalline transparent round and oval globules of the size of 0·00001, or rarely from 0·00003 to 0·00004 of an inch; some prepared by a newer method is stated to produce globules somewhat larger and more transparent than those obtained by the older process. We suspect there is some inaccuracy in the observed minuteness of these white lead granules.

In preparing white lead, it is very necessary that the metallic lead should be perfectly free from copper; minute traces of this metal communicate a pink tinge to the resulting white lead, which interferes with its purity of colour. We mentioned above, that white lead is a sesqui-basic carbonate, that is to say, it contains two atoms of neutral carbonate of lead and one atom of oxide of lead. Being prepared on the large scale, and by a process which has no pretensions to scientific accuracy, the amount of oxide of lead present varies; for instance, if the action of the carbonic acid is long continued, this oxide of lead becomes partially converted into carbonate, whereby the value of the white lead is increased. The smaller the quantity of oxide which it contains, the better does it spread, and the less is it liable to turn brown. Probably, therefore, pure neutral carbonate of lead, prepared by precipitating a solution of nitrate of lead with carbonate of potash, would be the best adapted for a pigment. It would, at all events, be advisable for those who prepare fine colours for artists' use to precipitate a white lead in this manner, instead of employing the commercial product.

Like everything else which has a money value in these days, white lead is shamefully adulterated by being mixed with considerable quantities of heavy spar, gypsum, or chalk. Heavy spar and gypsum, together with any sulphate of lead, which may be accidentally present, are detected by dissolving the white lead in dilute acetic or nitric acid. Chalk is detected by adding a slight excess of hydrochloric acid, evaporating the filtrate on a water bath, and digesting the residue in alcohol; this will take up all the chloride of calcium, which is present; and from this solution, mixed with water, oxalate of ammonia will precipitate the lime. The purity of white lead may also be ascertained by boiling it in a dilute solution of potash. If pure, it will entirely dissolve; but if adulterations are present, they will be left behind. In applying this test, care must be taken not to have the potash solution too strong, as this converts white lead into anhydrous oxide of lead, which might not dissolve perfectly.

Owing to the density, and highly-refracting power of lead compounds, this metal is of the greatest value in the manufacture of glass. To it we owe the advances which have been made of late years in the manufacture of photographic lenses, for, by giving to the optician a dense highly-refracting medium, he is enabled to produce lenses containing better combinations of curves than they could have obtained a few years ago, before the manufacture of dense glass had been brought to such perfection. Opticians, however, are limited in their employment of the densest lead glass for the manufacture of lenses, as this is so liable to tarnish by the sulphuretted hydrogen or volatile sulphides frequently present in the atmosphere. This extra dense glass is of much greater use in the manufacture of prisms; these only being required occasionally, and being almost exclusively confined to scientific laboratories, where their delicacy and value are well appreciated, can be made of a glass quite inapplicable for ordinary optical purposes, from its softness and liability to tarnish. It may be useful to some of our readers to know that the superficial film of tarnish which gradually forms over the surface of these prisms, in spite of every precaution, may be easily removed by dipping them into strong nitric acid, this does not appreciably injure the polish.

Faraday has greatly improved the quality of optical glass, by the researches in which he was engaged some years ago on this subject. He has obtained a glass composed of borate of lead, which has very valuable properties. For instance, by fusing 112 parts of oxide of lead with 24 parts of boracic acid, a yellowish glass is obtained, having the density of 6·4 and so soft as to soften even on immersion in boiling oil; this glass is a perfect insulator for electricity, and possesses very important optical properties. When the boracic acid is increased three-fold, the glass is nearly as colourless and as hard as flint glass, but has a greater refractive power. When 112 parts of oxide of lead are fused with 16 parts of silica, and 24 of boracic acid, a yellow glass is produced, of specific gravity 6·44, which fuses less easily than the first-mentioned borate of lead glass, but more easily than flint glass. Ordinary flint glass is a double silicate of lead and an alkali, potash, or soda; it is distingnished from other kinds of glass by its great density, refracting power, softness, and fusibility. When a large quantity of oxide of lead is present the glass is generally of a yellow colour. This colouration is even more perceptible in the case of the

extra dense borate of lead glasses above mentioned. There are strong grounds for supposing that this yellow colouration is not really due to the lead which is present, but to the small quantity of silver which almost always accompanies commercial lead. Photographers well know the intense colorific property of silver in glass. Their dark rooms, in fact, are now generally glazed with glass, flashed with a thin film of this intensely yellow silicate of silver glass, and they can, therefore, well understand that the presence in the lead of a trace of silver so minute that ordinary chemical analysis will fail to detect it is sufficient to produce a very serious colouration in the resulting glass. If glass-makers would go to the trouble of employing, for their optical glass, lead rigorously free from silver, there is no doubt that the colour of photographic lenses would be vastly improved, and with their colour their rapidity also. It is of little use to employ lenses ground to difficult curvatures, in order to secure the greatest rapidity of exposure, if the material of which the lens is made contains, dissolved in its mass, some of the very medium which, for its non-actinic properties, has been chosen for glazing the windows of their dark rooms.

ON THE WASHING OF PHOTOGRAPHS.

BY JOHN SPILLER, F.C.S.

Several communications upon the subject of the washing of photographs having been lately addressed to your journal, I trust you will allow me an opportunity of reporting the results of some experiments made a short time since in the same direction.

It is well known that the newly-fixed print, when first transferred to water, loses quickly a considerable proportion of the hyposulphite of soda, with which the pores of the paper are impregnated, but that, after a comparatively short interval, this interchange of water for hyposulphite does not progress with a speed at all commensurate with the large amount of water used in the washing; in fact, at an early stage a print is reached when the print parts but very slowly with the extraneous salt, even although a running stream of water be employed.

The explanation of this phenomenon is found in the circumstance that the washing of the print has advanced to a stage at which the power of diffusion, exerted between the dilute solution of hyposulphite and the external water, is so feeble that the removal of the former is necessarily slow. Such being the case, it is, I think, good policy to adopt the suggestion of Mr. Cooper, to use, alternately, hot and cold water, so that the varying densities of the liquid, and the effects of expansion and contraction of the fibres composing the paper, may be brought into play, and thus facilitate the removal of the soluble salt. On the score of economy, it would probably be advisable to proceed with cold water in the first instance, and then to use changes of hot water in succession, allowing the prints to remain therein until the whole bulk of the liquid has had time to cool.

The plan to which I have now to call attention is based upon a principle somewhat similar to the foregoing, but it differs in detail. At the stage which may be roughly defined as being that at which the prints have been washed to an extent equivalent to one hour's immersion in running water, I have transferred them into a cold saline liquor, made by dissolving a pound of common salt in half a gallon of water (the specific gravity of which, at 60° Fah., was 1·13), and there left them for fifteen or twenty minutes. At the expiration of this interval the salt brine had thoroughly penetrated the pores of the paper, and insured the expulsion of the greater part of the hyposulphite, which may now be poured away with the rest of the salt in solution. By then proceeding to wash again with common water, we are enabled to stimulate the principle of diffusion, and to promote the rapid interchange of water and salt, which will have the effect of reducing to a minimum the proportion of hyposulphite left in the print, and by finally washing in the ordinary manner, an unusual degree of purity is attained. By a treatment of this kind, the presence of hyposulphite in the finished proof is rendered impossible, the worst that could happen would be the retention of a trace of common salt, which, under ordinary circumstances, remains in the paper, as the result of using supplies of water of the usual chemical quality.

To assure you that the views thus stated are not merely hypothetical, I will report the actual result of experiment. A batch of prints, after leaving the fixing bath, were washed for half an hour in a constant flow of water, they were then divided into two parcels, one of which was treated with fresh water, for every change in the immersion of the prints constituting the second lot. These latter were placed for fifteen minutes in a plentiful supply of salt brine (sp. gr. 1·13), which, having been poured off the dish, was filled up with water, and after four more changes of common water, the prints were taken out and suspended until dry. The first lot received consequently six changes of water in the same time that the others had one of salt and five of water. On testing afterwards the white parts of the paper with a drop of nitrate of mercury solution, it was found that the amount of hyposulphite in the salt-washed prints was very considerably less than that retained by the water-washed prints. And, by continuing the process of washing in both cases alike, the difference could be remarked until the salt-washed prints were quite cleansed from hyposulphite, the others still retaining an appreciable amount.

By a reference to Professor Graham's tables of diffusion,* it will be found that common salt, besides being the cheapest, is, at the same time, one of the most efficient substances in regard to its power of diffusion into water. Of the saline compounds enumerated in the table, it stands, indeed, at the head. In conclusion, it is important to remark that the difference in gravity between two dissimilar solutions, does not generally govern the rate of diffusion. Their indices of transpiration appear to be more closely connected with their relative chemical affinities for water, and for each other.

Chemical Department, Royal Arsenal, Woolwich,
March 1, 1864.

HOW TO TAKE A TRANSPARENT COPY OF A PHOTOGRAPH, PRINT, OR ENGRAVING, BY THE DRY PROCESS.

Being Short Lesson in Photography.—No. 21.†

In this lesson I suppose you are already familiar with the mode of taking a negative or transparent positive of an object, print, photograph, or engraving, by the wet process; and, consequently, I need not repeat the instruction already so often given on this head, nor remind you of the absolute necessity of being very accurate in focussing, whenever a copy of a print has to be taken of the *same size* as the original; and still more must I insist upon this accuracy if the copy is to be *much larger* than the original.

If you know beforehand that your negatives will be required for the special purpose of making *transparent positives*, either for the stereoscope, stereopticon (properly magic lantern), or in the decoration of windows, you require special instruction in regard to such negatives. In the first place, the glass on which the negatives are taken must be perfectly flat and its surfaces parallel, and the thinner such glass, within certain limits, so much the better. Secondly, the negative image must be bright, clear, and sharp; this condition naturally excludes all fogginess. Thirdly, if *stereoscopic* transparent positives are required to be copied from a given negative, this negative has to be prepared in the following manner:—

It is supposed the negative is already varnished. Lay the negative, with the collodion film downwards, upon a piece of soft paper or cloth, and then make an incision with a diamond right through the middle, thus bisecting the two lateral edges. Next measure from this central line two inches and one-half to the right and left, and with a square on the lateral edge make two other incisions parallel with the central line; be very accurate

* *Vide* "Miller's Chemistry," Second Edition, vol. i. p. 71.
† From *Humphrey's Journal.*

in this operation. Should it happen that the division between the two negative images be not a line, but a space of variable width, as is very often the case, then measure two inches and a half right and left from either side of this dividing space. These incisions being now properly made, break the negative—firstly, into two halves; and, secondly, each part into two, of which the end piece in either is to be laid aside as useless.

The next operation is to place in the plateholder a plate of well-cleaned plate glass large enough for the purpose; then lay the two stereoscopic negative images upon this plate, collodion side upwards, in juxtaposition, but inverted, so that the parts which before were contiguous in the middle in the uncut negative, now form the boundaries of the two ends. The lower lateral edges rest, of course, upon the lower edge of the plateholder.

Now, place upon these two negatives a plate of glass already prepared with a sensitized dry film, so that the film containing the image and the film which has to receive the image are in close apposition; this plate need not be any larger, or, at least, but a trifle larger, than the size of the two stereoscopic plates in juxtaposition. Close the door of the plateholder. The spring attached to the inner side of this lid will, by its elasticity, hold these three layers of glass firmly in connection with each other, so that thus, supposing they are all made of plate glass, they form, as it were, one compact mass of glass.

The next operation brings us to the exposure of the film to light. Do not expose to the direct rays of the sun, but proceed to an open door or window where the light is subdued and unobstructed by light of any kind that might fall upon the picture. With such a light an exposure of one second, in general, will be quite sufficient, and in many cases more than sufficient.

Be very careful, when you open the slide of the plateholder, to have the latter in such a position as to receive the illumination free from shadows produced by the edges of the plateholder itself; otherwise these shadows will be impressed on the transparent positive.

As I observed, the exposure during one second may be too much; and, probably, any exposure that you might give, by drawing out and closing the slide, would in some cases be too much. When this is the case, shut the door and make the exposure in the diffused light of the room.

In the development of dry transparent positives I prefer not to give the whole intensity before fixing, but to proceed, as I have already directed you, in the intensifying of a wet collodion negative; that is, develop the film until the picture is quite perfect in all its parts, still free from all fogging, but not yet sufficiently intense. At this stage wash the film well and fix in hyposulphite of soda, and again wash thoroughly, so that no trace of the hyposulphite remains.

The picture is developed as rapidly as by the wet process. The developer for a stereoscopic slide, such as the one I have been instructing you about, consists of—

A saturated solution of bicarbonate of soda	30 minims.
Rain water	4 drachms.
Solution of pyrogallic acid (10 grs. of alcohol to an ounce)	6 drops.

Mix intimately before it is poured upon the plate. The latter, that is the film, must first be thoroughly moistened before the developer (Sutton's) is flowed over it. The picture will soon appear. When all the details are out, the plate is carefully washed, and then covered with the ordinary pyrogallic acid developer, which contains:—

Pyrogallic acid	1½ grain
Acetic acid	1 drachm
Water	7 drachms

Take a sufficient quantity of this developer, according to the size of the plate, and leave it upon the developed picture for a few seconds, then pour it off into a measure glass and add to it six drops of a 20-grain solution of nitrate of silver. When the image is floated with this solution, the intensity will gradually increase; and, if no fogging supervenes, the operation may proceed until the opaque parts are as intense as the nature of the picture requires. If, however, there is any tendency to fogging before the proper intensity is reached, wash the plate as just directed, and intensify afterwards.

The great beauty of this mode of preparing transparent positives consists in the possibility of performing the whole operation by artificial light. It is, therefore, quite a pleasant evening's recreation, where a good gas light can be procured to perform the work of exposure; and, even when this fails, you can make use of the following expedient:—

Take a piece of phosphorus of the size of a small pea, and place it upon a brick in any convenient position. As soon as the plateholder is already furnished with the sensitive plate, light the phosphorus, draw the slide, and hold it so that the plate is uniformly illumined. By the time the phosphorus has become extinguished, or, even before, the actinic impression will be complete. Be careful not to make any draught in the air in the neighbourhood of the burning phosphorus, otherwise the fumes of phosphorus may be driven on the side of the plate, and thus the cloud will obscure the brilliancy of the illumination.

An operation of this nature, performed thus in the midst of a phosphoric illumination, is quite enchanting; for, when the picture appears in all its brilliancy, it looks like an act of magic—as if the wizard, with his wand, had bid the image start forth from the glassy matrix.

During the long winter nights, what a glorious field for amusement and instruction is here presented to the rich and intelligent, who yawn and yearn for occupation! We pity the man at this age of the world's creation who, in the midst of such stores of discovered phenomena, finds *time long, life irksome.* For him we may invert the adage and say: "*Ars brevis, vitæ longa.*" Art for him has no charms, and life is a bore. Helpless clod! learn photography, and at the same time learn to admire and adore thy Creator!

Transparent positives may be mounted, whether for the magic lantern or the stereoscope, with a plate of thin glass over the film; this is preferable to varnish, which seems to thicken the film, and render it more uniformly opaque.

Between the two glasses a piece of paper, blackened on both sides, is inserted. From this paper are cut out the proper oval, rectangular, or square openings, which admit the pictures to be seen clearly defined by dint of contrast. Where the light has to be subdued, another piece of plate-glass is placed behind the stereoscopic plate, of which the inner surface is ground in order to render the glass translucent; or a piece of coloured tissue paper is placed over the film, by which a view can be represented as if seen by moonlight, &c.

This assemblage of plates is finally cemented together on the edges by means of a narrow piece of tape glued on one side, and carried all round and terminating at the point of starting.

When only two glasses are used, of which one is ground glass, and the film is between them, the original stereoscopic negative has to be copied by means of a bilenticular camera into a transparent positive. From this a negative is obtained by contact, from which transparent positives can be obtained also by contact, in which the conditions will exist for the purpose required.

PHOTOGRAPHY AND PHOTOGRAPHERS.*

The process by which the image of an object is intercepted and fixed in a visible shape, though of recent discovery, has yet become so familiar, and its development and application so universal, that we have almost ceased to regard it with wonder. Nevertheless, the instantaneous production of a photograph is one of the most wonderful achievements of science. The bodily presence of such an one is, as it were, created out of nothing—filched from the eye of the sun. There can be no mistake about this shadow of the substance: the resemblance, where the process of obtaining it has been practised with ordinary skill and intelligence, is so close to the original, that a little child will infallibly recognize it, and criticism bows before the verisimilitude which, upon æsthetic grounds, it believes itself bound to condemn. The interest excited by photography appears to be ever on the increase. The productive power of the camera in Europe is at present only exceeded by that of the printing-press. Every living celebrity, from the French Emperor to Tom King, every existing building, ancient and modern, every alp and glacier, scenes of beauty and peace, of carnage and the battle-field, every visible existence, are daily presented to thousands of lenses, by which their images are received and painted in the camera as upon the retina of the human eye—that which is transitory in its nature being arrested and fixed for evermore as one of the visible influences that shall act upon human souls.

The vulgarity of photographic portraiture at the present time

* From *The Reader.*

is, we believe and trust, at its height. If the absence of knowledge, taste, and feeling in the great majority of those who practice as photographic *artists* were the exception, instead of the rule, we should be amazed at the sufferance so long extended to the productions which now fill shop-windows and albums.

To all who have seen what beautiful arrangements of figures have been set before the camera by any educated artist who has worked as an amateur, or by way of helping himself in his art, what suggestions of beauty he has obtained by careful adaptations and skilful focussing, it must be a matter of deep regret that the practice of photography has never yet been properly developed, and that its capabilities, apart from the chemical agents indispensable from its practice, have never been fairly tested. It has not only become a trade, but a very low trade—a mine of wealth to some more skilful practitioners, whose productions, as far as any knowledge of art is displayed in them, are on a level with those which may be obtained for sixpence in the New Cut. Apart from the artistic knowledge and experience which should always direct the production of good photography, its results, however wonderful, are eminently unsatisfactory. We must all be struck by the vulgarity, monotony, and poverty of resource exhibited by common carte de visite portraiture. The distinctions so patent between a lady and her maid, between a statesman and a prize-fighter, between a poet and a performer on the tight-rope, are unknown to photography, chiefly because they are unfelt by the individual who undertakes the all-important duty of posing the sitters and arranging the background. So that he gets them well set up against his detestable balustrade or make-believe furniture, and disposes of them in five minutes, he is perfectly satisfied. Nothing puts him out but a disarrangement of his chemicals or a defect in the light. He does not know what a painter means by "treatment," and how it constitutes nearly all the difference between good art and misdirected labour.

Many painters have taken up photography as amateurs; but only two or three have made themselves thoroughly acquainted with its capabilities, and devoted a large amount of time to develop them. The first painter who really gave himself up to its practice, and intermitted, for the space of two years, the ordinary work of his profession, was Mr. D. O. Hill, of Edinburgh. About the year 1848 he produced a set of portraits which we still think of as among the very few photographic portraits in which there was evidence of intelligent direction as regards pose and arrangement. These were done before the discovery of the collodion process, and derive much of the suggestiveness which characterizes them from the imperfection of the process then in use. These portraits are full of character, reminding one of Rembrandt and Reynolds, being posed and arranged by the help of an educated faculty akin to theirs. Until now, these portraits have never been equalled, far less surpassed.

Equalled and surpassed, however, they have been at last by Mr. Wynfield, an artist already well known as an accomplished figure-painter. The large photographs lately taken from life by him are the best portraits that have ever been produced by means of photography. The series already completed consists of portraits of well-known artists:—Calderon, Marks, Leighton, Henry Phillips, Prinsep, John Philip, Gale, and others. In the production of these portraits, Mr. Wynfield has neglected no means of ensuring success. Taught, by a true painter's instinct, that one of the greatest defects of ordinary photographic portraits is a hard and false realization, his first thoughts were given to the means by which it might be remedied. This difficulty he overcame in a characteristic way, by rejecting altogether one of the chief canons of the craft, which maintains the importance of immobility on the part of the sitter. Mr. Wynfield is not only careful to place his subject out of focus, but he directs him even to move slightly, so that all the lines and boundaries of his form shall be modified and softened. The most ugly feature of a photographic likeness is by these simple modifications entirely removed; and Mr. Wynfield is free to employ the resources of his own judgment and taste in the arrangement of his model. The chief characteristics of these portraits are the substitution of a mediæval for the modern costume, a small quantity of background skilfully disposed to assist the figure which occupies the greater portion of the square, and the importance given to the heads by the exclusion of all that does not help to give them due prominence. The hand is frequently introduced with good effect, as by Titian and Vandyke, of whose portraits we are constantly reminded by these photographs. It is also not one of the least interesting points about them that they bring out the great importance and value of costume. The figures of these painters, comparatively ordinary in modern garb, appear as great Venetian or Spanish nobles under Mr. Wynfield's treatment. Altogether, these portraits are most remarkable and valuable additions to photographic art; and Mr. Wynfield deserves our grateful acknowledgment for making the greatest step forward in the direction of good photographic portraiture since the time of D. O. Hill.

PHOTOGRAPHY APPLIED TO MINIATURE PAINTING ON IVORY.

BY J. LAWRENCE.*

While a great many persons possess more or less talent in the art of colouring, but few, comparatively, are able to draw accurately, particularly from a living subject. Photography has opened a wide field both for industry and pleasure, and the innumerable specimens of coloured photographs, exhibited in every city, shows plainly the advantages which that, one of the greatest inventions of the age, has bestowed upon the community.

However, the superiority of ivory over paper, for the purpose of painting in water colours, has so far maintained its supremacy, inasmuch as the smoothness of the surface lends a softness, particularly to flesh tints, with which the ivory-type only can compare.

But even this does not offer the same security for durability as the ivory, for the accidental breaking of the glass must necessarily destroy the picture. It must therefore be gratifying to know that accuracy of drawing and correctness of likeness can be obtained by the printing of a photograph upon ivory, enabling the artist to defy criticism in that respect. The process of blue printing from the negative appears to furnish that much-desired improvement; and after many fruitless experiments, success has at last been obtained, which will enable many persons, deficient or even totally ignorant in the art of drawing, while otherwise talented in that of colouring, to bestow their labours on a more desirable and durable material. The process is simple, and consists in immersing the ivory, already ground and prepared for painting, in a solution of double oxalate of iron and ammonia. The side of the ivory which lays downwards in the pan, should be marked in the corner with pencil, so as to expose the opposite surface for printing. It requires to be immersed from two to three days. When dried it will require an exposure in the sun, varying from forty-five minutes to one hour to obtain an image. Develop by immersion in a solution of oxalic acid and red prussiate of potash, watching the progress, and afterwards wash in pure water for a few minutes. When dry, the excess of oxalate of iron and ammonia can be brushed off with a hard bristle brush. If after development the print should be found too intensely blue, make a very weak solution of cyanide of potassium (say a piece as large as a pea, dissolved in six ounces water), and immerse the ivory therein, keeping it in motion, and watching its fading. When sufficiently pale, wash in clear water, and dry in a shady place.

PHOTOLITHOGRAPHY WITH SILVER SOAP.

BY M. CAREY LEA, PHILADELPHIA.†

About a year since I prepared some oleic acid, with a view to examine its applicability as a photographic agent for carbon printing, in conjunction with bichromate of potash. The results were not encouraging, and I discontinued the investigation.

Mr. Quaglio, an engineer of Vienna, has just made public a process in which the same acid has been successfully used in another direction, in connection with oxide of silver. He finds that light has the property of altering the oleate

* *Philadelphia Photographer.*
† *Philadelphia Photographer.*

of silver, and, in fact, Gerhardt, in his Chimie Organique, observes that the oleate of silver is so unstable as scarcely to admit of study. On this alterability Mr. Quaglio grounds a mode of photolithography which it is very desirable should be fairly tried, and I therefore translate his directions, in order to place them at once before the photographers of this country,

The lithographic stone is first to be grained, and then is covered, with a solution of gum arabic. Several hours after drying it is to be washed, and then to be covered, with the aid of a flannel rubber, with the silver soap. It is then to be exposed under a negative to the sun. The exposure requires about half an hour. It is next to be washed with rectified naphtha, to remove the portions unacted upon by the light, and is to be gummed and inked-in in the ordinary way with lithographic stones. The stone is then ready for printing, and is capable of affording, according according to the author, as many as two hundred impressions.

The silver soap is obtained as follows:—Dissolve castile soap in hot water, filter, and precipitate with nitrate of silver. Collect the precipitate on a filter.

It is probable that the substance sold under the name of "benzole," would answer for removing the unaltered portions of the oleate of silver.

The above process evidently depends upon the oxidation of the oleic acid at the expense of the oxygen combined with the silver, and it would be a matter of interest to ascertain whether the oleate of silver could not be replaced by the oleate of some other metallic oxide which readily parts with its oxygen, or a portion of it. As peroxide of iron does this with great facility, it would be interesting to ascertain if the per-oleate of iron (obtained by precipitating castile soap with a neutral per-salt of iron, such as iron-ammonia alum), would not give equally satisfactory results with an important economy.

The above process is an extremely easy one, and, if it gives good results, will prove very valuable. The impression is obtained from a negative, the production of a transparent positive is not therefore required, as in some other processes.

Proceedings of Societies.

London Photographic Society.

The usual monthly meeting of this society was held on Tuesday evening, March 1st, Mr. J. Glaisher, F.R.S., in the chair.

The minutes of a previous meeting were read and confirmed, after which Madame Brunner and Mr. Edmond Bayley were elected members of the society.

The Chairman stated that a letter had been received at the last moment from Mr. England, regretting his inability, from other engagements, to be present and read a paper that evening. They had hoped to have had a paper by Mr. Swan, on "A New Carbon Process," but were disappointed. He was enabled, however, by the kindness of Mr. Wharton Simpson, to exhibit some specimens of the results of this process, which Mr. Simpson very properly styled the most perfect pictures hitherto produced in carbon. He then read a note from Mr. Simpson, who stated that Mr. Swan had promised to give the process to the world through this society, and would read a paper on the subject at the next meeting. (Applause.)

The specimens were then passed round, and excited much interest and admiration.

The Chairman then read a letter from Mr. Squire, calling attention to some specimens illustrating the working of his improved Shepherd's lens. The chairman also exhibited a blue print, produced on the sensitive paper presented to members at the last meeting by M. Marion, and also called attention to a sample of M. Marion's albumenized paper, six yards in length.

Mr. How then exhibited with the magic lantern, using the oxyhydrogen light, a number of photographs of subjects from Scripture after the old masters, the transparencies being produced by the tannin process, by Mr. C. Jones. The series included pictures after Rubens, Poussin, Guido, Rembrandt, Raffaelle, Overbeck, Da Vinci, Caracci, Vanderwerf, West, Copley and others. These were followed by copies of Mr. George Cruikshanks' "Bottle," after which a series of fine views of Java scenery, by Mr. Walter Woodbury were exhibited.

The Chairman, in proposing a vote of thanks to Mr. How, commented on the beauty of the results, and the great value of the application of photography.

The Secretary then read extracts from some further "Remarks," issued by the grandson of Matthew Bolton, on the alleged early photographs (see p 111).

The Chairman then announced that the regulations of the next exhibition would be published in the next number of the journal. He might mention that these regulations would be much more stringent than they had been on former occasions, and they would, moreover, be carried out strictly, and to the letter. They wished this to be in the strictest sense an exhibition of the capabilities of photography, without the intervention of the artist in retouching or painting. No touched or made-up picture would be admitted: none that would not, as had been suggested by M. Claudet, bear sponging, if necessary, to test them. He hoped photographers would assist the council, and not give them any unnecessary trouble in carrying out these regulations, as, however painful it might be to them, they must carry out the conditions vigorously, and exclude every picture which did not comply with them, no matter how high the position of the photographer who might send it.

The meeting then adjourned.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, March 2nd, 1864.

The last meeting of our Photographic Society was held in the new and convenient locality obtained for it in the Rue Cadet. It was felt, however, that the room appropriated to meetings and public business was rather too small for occasions when matters of more than ordinary interest would be likely to attract a large concourse of members. This is an inconvenience that fortunately can easily be remedied.

Professor Burgue, of Chauny, exhibited an apparatus by means of which all the operations of photography may be performed in the open air. It is a bellows camera, the front portion of which only is moveable; the other portion is fixed and closed by a yellow glass, through which the development of the picture may be watched. The collodioned plate is fixed in a vertical frame, and can be immersed at pleasure, successively, in the four sections of a drawer placed beneath the apparatus, moving in a horizontal plane. To operate we pour, in proper order, into the baths of the drawer, the solutions required in the operations. The collodioned plate is first lowered into the silver bath, then exposed: the drawer is made to advance by turning a handle, and then the plate is allowed to descend into the developing solution. The plate is then washed in the third bath, and lastly, dropped into the fixing solution. Professor Burgue's apparatus enables the photographer to work in full daylight, without tent, dark box, or other similar contrivance. This apparatus is referred to the committee who have to examine and report upon the developing apparatus of M. Titus Albitès, and we shall shortly have their opinion upon the respective merits of each.

M. Liebert, whose solar camera was described in the last number of the Photographic News, has made a special photographic study of the gold mines of California. His album, exhibited at this meeting, contained most curious and important data upon the present state of the metallurgy of gold in this El Dorado.

The exhibition of our Photographic Society will be opened on the 1st of May next, and continue open until the last day of July. The rules and regulations published some time ago remain without alteration or addition.

MM. Davanne and Girard read the continuation of their

important "Researches on Positive Printing," devoted to the fading of positives, its cause, and the means of avoiding it.

M. Richard exhibited a heliostat, intended for enlarging photographic pictures. Like the heliostat of M. Leon Foucault, this apparatus carries a mirror of large dimensions.

An interesting discussion took place upon the expediency of admitting or wholly excluding "touched" photographs at the forthcoming exhibition. The prevailing feeling seemed to be that "touched" and coloured photographs ought not to be excluded, but that pictures otherwise than photographs, pure and simple, should be so designated and placed apart in the exhibition. Processes and manipulations have now attained such perfection that the necessity for hiding defects with the aid of pencil and pigment must be the exception rather than the rule, and employed with the aim of producing effects non-photographic. There is, moreover, this objection to "touching" photographs, that where it is admitted there is no knowing where it will stop.

Certainly, a profound revolution in the art of engraving is imminent—that is, provided all becomes realized that discoverers who keep their secrets have promised. By a combination of methods now actually known, it appears to be really possible to obtain an engraved steel plate from a photograph, complete, ready for taking any number of impressions from, within the space of an hour, more or less. M. Vial, in his process of rapid engraving, does not profess to engrave the photographic negative itself, but rather to reproduce an engraved photograph. Yet there is no doubt he could accomplish that desideratum were he to put "this and that" together. M. Disderi lately announced that the feat has been accomplished by M. Girard—viz., engraving the photographic picture at once on copper and steel; and I observed in the last number of the Photographic News that Mr. Swan asserts that he can do the same; and if his success in that direction be equal to what he has achieved in carbon printing, we may look confidently for a satisfactory result. M. Persiani now tantalizes us with the announcement that, by means of a new process of engraving, he is enabled to obtain, with mathematical accuracy, *fac-similes* of old engravings, rare manuscripts, original drawings, copies of works by the great masters, lithographs, line and wood engravings, and letter-press. The agents hitherto employed for such reproductious are: chemical baths, intended to restore to printing ink its original properties; the system of capillarity, or the absorption of a liquid by the paper; and the impermeability of the characters or designs in printing ink. These various processes—applicable only to certain engravings, as well as the photographic process—are all defective, compelling us to adhere to the surer, but dearer and least faithful process, that of recopying upon the plate—by means of the burin, the pen, or the dry point—a picture for the most part reversed, and afterwards submitting this plate to biting with an acid; and, lastly, of "retouching it, if if does not accurately represent the original."

M. A. Persiani, after numerous experiments, has succeeded, by a mechanical process, in converting upon various metals, drawings, engravings, old and new, into intaglios or relievos, and that without the slightest alteration. The proofs are perfectly exact, and can be reduced or enlarged at pleasure. This rapid and economical process, which is applicable to chasing, to calico-printing, paper-hangings, porcelain-painting, &c., is intended to form part of a series of reproductive methods for multiplying rare, valuable, and curious engravings and books, at very low prices, and is, therefore, a new means of popularizing works of art. A company—at the head of which is M. Jules Gailhabaud, the publisher, so well known by his important archæological works—is established to develop this important invention.

What the photographer most desires to see accomplished is the actual photograph engraved automatically on the copper or steel plate, producing proofs equal to the present positives on chloride of silver paper. It is not extravagant to hope and expect to see many specimens of this result in the forthcoming exhibitions. The first who succeeds, satisfying the demands both of photography and art, will well merit a large prize, as compensation for sacrifice of patent rights.

Your leading article in the Photographic News of the 19th February, on "Mr. Swan's New Carbon Process," has been translated in *La Lumière*. The Editor, M. Gaudin, appends the following remarks upon the subject. "Nothing is more certain than the near and much-coveted triumph of carbon printing over silver printing in photography; the permanent over the uncertain and the ephemeral. But as to photographic engravings from natural objects, with all their details, it may be, in the absence of positive evidence, doubted if its accomplishment is so nigh as is often asserted.

There is at the present time no little excitement prevailing in photographic ateliers, caused by the advent of a photographer from Switzerland, who possesses a very beautiful carbon process, and who has obtained the cession of M. Poitevin's patents of 1855; he has also himself patented a process for an insoluble gelatine paper.

He introduced himself to the principal Parisian photographers, saying:—"See these carbon pictures; I offer to produce others as good in your presence from any negative you may place in my hands; you will see that my method of operating is very simple and easy, and that the pictures obtained are permanent. I have secured the patents, and if you chose, I will show you my process, and sell you the right of applying it." But he took care to add, "I shall make to the first who adopt my process the greatest possible concessions, promising to demand a much higher price from such photographers as adopt it, only when compelled by competition." And in the most convincing and confident tone, he asserts that in a very short time his will be the only process in vogue, because the public is tired of buying portraits which have no durability, while carbon is unchangeable. It appears that several of our photographers have already bought licences, and we have seen carbon pictures produced by them which are really very pretty. This is what causes such a flutter among photographers at the present moment, and it is very probable that a revolution in photography has just broken out.

NITRATE OF SODA IN THE SILVER BATH.

Sir,—I have made many experiments in sensitising with a bath composed of a small quantity of silver, plus a quantity of nitrate of soda, and I can fully corroborate the evidence of your other correspondents as to the advantages to be gained by its use—having got very good prints (indeed quite as good as with stronger baths) when using only 7½ grains of silver to the ounce of water. The proportion of nitrate of soda does not appear to be very material, provided there is sufficient. I have seen it stated somewhere that the addition of uitrate of soda was "sheer nonseuse," for certain alleged chemical reasons. I am not much given to theorising, finding it not very profitable, but my idea of the action of the nitrate of soda may be put in this way:—We all know that only about 5 per cent. of the silver generally used in sensitising goes to form the image on the albumenized surface; all the rest is removed in the washing. Those who insist upon the necessity of a strong solution can perhaps tell us what part the 95 per cent. which does *not* go to form the image actually plays. From the fact that a bath consisting merely of 5 grains of nitrate of silver to the ounce of water dissolves off the albumen, and a stronger bath does not, it may be inferred that the only use we can indisputably find for the other 95 per cent. is in effecting the coagulation of the albumen.

Taking this to be correct, and in connection with the actually ascertained fact that a bath containing 5 grains of silver, plus a quantity of nitrate of soda, also coagulates the albumen, and forms the sensitive surface of chloride of silver, it is only fair to assume that in using strong silver baths we are unnecessarily employing a very costly article, the place of

which, for a specific purpose, may be filled by one of merely nominal value. I do not advocate by any means the use of a bath so weak as that I have mentioned, for the obvious reason that it would require to be perpetually strengthened, and would therefore be inconvenient. Besides, with some negatives, and in certain states of the light, it is clear that somewhat stronger baths give better results; but that has nothing to do with the actual question; because, if nitrate of soda permits the use of weak silver solutions with some negatives, it proves that it cannot do "merely neither good nor harm," as I have also seen it stated. Probably some other substances would do as well as nitrate of soda, or better. Moreover, if a strong silver bath is necessary, how do we account for the fact that an ammonia nitrate bath of 30 grains will yield as good results as can be desired, or, indeed, secured, with one minute's floating—as is done daily, to my knowledge, by a very good London photographer?

No doubt, as one of your correspondents intimated, the paper has something to do with the matter, as also has the nitrate of soda. Commercial nitrate of soda, with few exceptions, is very impure, but if it were in greater demand, there would be no difficulty in obtaining it sufficiently pure for the purpose. I have always used with it either Sutton's Patent Albumenized Paper, or the Medium Saxe prepared by the same firm, floating three minutes, with neither of which have I ever had a single failure; and I have toned with either the calcio-chloride If gold, toning solution, or a lime bath very nearly on Mr. Parkinson's formula. I have not found that the printing occupied a materially longer period than when I used a strong silver bath. Occasionally I found the silver solution become more rapidly discoloured than usual, and this I remedied by the addition of about four drachms of methylated alcohol to a quart of bath as often as was found necessary—every other day, for instance, when in constant use. I have generally employed 30 grains of silver and about the same quantity of nitrate of soda to the ounce of water, working the bath until reduced about one-half in strength, and then replenished it from a 100-grain solution kept ready for use; but I do not advise the bath to be worked to lower than 20 grains of silver.

What I contend, therefore, is not that the nitrate of soda plays any part in the production of the print—as many who have commented on the subject seem erroneously to have inferred—but that for certain purposes it takes the place of so much of the nitrate of silver as is not required to produce the image, probably preventing the albumen from becoming dissolved, as it would be by a very weak nitrate of silver bath.

In conclusion, let me say I quite agree with your observations on this subject. We must not too rashly set mere theory against fact. No sensible man would do so, especially in chemical matters, for how many chemical theories have been upset even in our time? There is much yet to be discovered in photography, even on those points which appear to some to be most satisfactorily settled.—I am, sir, yours obediently, Experientia.

P.S.—Since writing the above, I find I was slightly in error as to the time of floating on the ammonio-nitrate bath. The printer of the firm in question (whose names I send you, in confidence) informs me, that he only allows the paper to remain on the bath a *few seconds*, and that he also uses the same paper as myself.

Photographic Notes and Queries.

Suggestion *versus* Invention.

Sir,—Will you permit me, in reply to Mr. Aldis, to state the real facts of the case alluded to in his published letter.

On the occasion to which that gentleman refers he found me at work with the solar camera, which was then arranged in a makeshift manner, after the fashion shown in the engraving you reproduced from the *Art-Student*. On seeing this, Mr. Aldis suggested that I should make such an arrangement permanent and convenient by attaching the camera to a board; and in reply, I pointed out how the use of such a board would cut off a very valuable portion of my light. Hence arose the suggestion of a frame, which suggestion was mine. Mr. Aldis certainly sent me a drawing embodying the ideas we had discussed, but that drawing only resembles the machine engraved in the *Art-Student* to a very small extent.

If Mr. Aldis, however, thinks that my suggestion re-suggested gives him a claim to the resulting invention, he is perfectly welcome to his opinion.—I am, sir, yours truly,

Sydney Smyth.

43, *Leighton Road, Kentish Town, N.W.*

Enlarged *versus* Direct Negatives.

Sir,—Your courtesy in answering a few questions I submitted to you a week or two ago, encourages me to ask your opinion upon another point.

I have hitherto been in the habit of taking views stereo size only, and am ambitious of producing something larger and more important. I possess a pair of Dallmeyer's excellent instantaneous stereo lenses, and a lens which will produce pictures 9×7. I wish to obtain prints from this size up to 12×10, and the question I wish to submit to you (or any of your readers competent to answer it), is this:—Can I produce better prints from negatives up to this size, taken *directly* in the camera, or can I obtain prints equally good from negatives *enlarged*, from quarter-plate or stereo size.

To amateurs like myself, wishing to produce proofs of respectable size, the above question is a very important one, and the opinion of operators, competent from *experience* to give one, would be valuable and interesting. The *convenience* of taking small negatives, be they wet or dry, instead of large ones, is self-evident. If you use a dry process, a small plate is much more easily prepared than a large one, and more safe as to its results. If you prefer the wet process, the advantages are equally great, small plates being so much more easily coated, prepared, and developed than larger ones, especially in a box or tent.

If, then, these could be enlarged to the requisite size, and *first-class* prints obtained, it seems to me it would be an immense advantage, as, if the negatives were stereos, on double quarter plates, they could then be used for stereo views, album views, and large prints of any dimensions you please. The extra trouble of enlarging may, I think, be eliminated from the question, as this may be done at leisure when the tourist returns home, whilst, when from home, most amateurs, I fancy, like myself, desire to carry with them as little impediments as possible in the way of apparatus.

If you think the question I have raised of sufficient importance, I should be glad if you would give this letter a corner in the News, that it may have a chance of being properly ventilated, as I am quite sure your opinion, and that of other experienced photographers, will be a boon to amateurs like myself.—I am, sir, your obliged servant, An Amateur.

[If you have convenience, you will unquestionably produce better pictures up to 12 by 10 direct, than by enlargement. Very good pictures may be produced by enlargement; and it is possible a time may come when the best results may be obtained by producing perfect small pictures and enlarging; but at present it is better to take pictures of the size you name direct. As yet the enlarging methods have not been largely practised. The Coming Man, who shall invariably produce pictures by enlargement as good or better than large ones direct, will be hailed with delight on his arrival. Can any of our readers give any information as to his probable advent?]

Alkaline Gelatine Process.

Dear Sir,—I certainly took it for granted that Mr. Cooper had prepared his alkaline gelatine plates, as stated in the first part of the article, which is very much at variance with my plan; and I have invariably found that, by washing off the soda, a fatal diminution of sensitiveness has resulted. I never use 15 grains of gelatine, but from 5 to 8 grains per oz.—8 I think best—with ½-grain of soda, applied to the plate as hot as possible. I have very little trouble with network markings, and never use a salt bath, but thoroughly wash the film only—plain pyro and water development (3 grains per oz.), and then intensifying as usual. Am not annoyed with fog, but get particularly brilliant negatives. I have now adopted the morphine bath in their preparation, and am so well satisfied with the process, that I intend always using it, when requiring dry plates. I

venture to say, that if Mr. Cooper can spare time to try the process again, and, if possible, with the morphine bath, he will be pleased with the results. The few plates I had the honour of sending you for trial were prepared as above; and as far as exposure and development could do, they, in your hands, corroborated what I have said.

I am, dear Sir, yours respectfully,

Egham, Feb. 27, 1864. WM. BARTHOLOMEW.

THE SUN THE GREAT MOTOR.—Every mechanical action on the earth's surface, every manifestation of power, organic or inorganic, vital or physical, is produced by the sun. His warmth keeps the sea liquid, and the atmosphere a gas, and all the storms which agitate both are blown by the mechanical force of the sun. He lifts the river and the glaciers up the mountains, and thus the cataract and the avalanche shoot with an energy derived immediately from him. Thunder and lightning are also his transmuted strength. Every fire that burns and every flame that glows, dispenses light and heat which originally belonged to the sun. In those days, unhappily, the news of battle is familiar to us, but every shock and every charge is an application or misapplication of the mechanical force of the sun. He blows the trumpet, he urges the projectile, he bursts the bomb! And, remember, this is not poetry, but rigid mechanical truth. He rears, as I have said, the whole vegetable world, and through it the animal; the lilies of the field are his workmanship, the verdure of the meadows, and the cattle upon a thousand hills. He forms the music, he urges the blood, he builds the brain. His fleetness is in the lion's foot; he springs in the panther, he soars in the eagle, he slides in the snake. He builds the forest and hews it down—the power which raises the tree and wields the axe being the same. The clover sprouts and blossoms, and the scythe of the mower swings by the operation of the same force. The sun digs the ore from our mines, he rolls the iron, he rivets the plates, he boils the water, he draws the train. He not only grows the cotton, but he spins the fibre and weaves the web. There is not a hammer raised, a wheel turned, or a shuttle thrown, that is not raised and turned and thrown by the sun. His energy is poured forth into space, but our world is a halting-place where his energy is conditioned. Here the Proteus works his spells.—*Heat considered as a Mode of Motion, by Professor Tyndall.*

Talk in the Studio.

THE SHAKSPEARE TERCENTENARY.—The national celebrations of the three hundredth birth-day of the world's greatest poet are giving a great impulse to photography. Stratford-on-Avon is, we understand, at the present moment inundated with photographers giving pictorial embodiment to everything rendered sacred by association with the great name which has immortalized the place. Mr. Blanchard will shortly issue a good card picture of the Stratford bust. Mr. Hain Friswell's "Shaksperian Portraits," illustrated by photography, is a choice volume, already enjoying deserved popularity. Mr. Bedford's stereographs are also very popular. We copy the following from *Aris's Birmingham Gazette*:—"Messrs. Burton and Sons, the enterprising photographers, of Birmingham, Leicester, Derby, &c., have been appointed by the Stratford Committee to publish a series of views and portraits in connection with the approaching celebration, and these will be issued to the public under the official stamp and authority of the committee. These pictures will have a general and historical as well as local interest; and there is every reason to expect that they will be executed in a style worthy of the occasion."

FELICITOUS USE OF PHOTOGRAPHS.—The great families of Russia have conceived rather a pretty idea, which has become the Muscovite mode, that is, to present visitors to their country residences, as a souvenir of their sojourn, an album which contains a photographic illustration of the happy days they spent—photographs of the personages who formed the society, of the mansion, the sights and scenes, the stables, the horses, the principal episodes and events during the aristocratic *villeggiatura*.

BUILDING GLASS HOUSES WITHOUT CONSULTING THE DISTRICT SURVEYOR.—On Wednesday last, at the Clerkenwell Police Court, Mr. William Pimm, a photographer, of 68, Euston Road, was summoned before Mr. Barker, at the instance of Mr. Henry Baker, the district surveyor of St. Pancras, to show cause why he had not given notice in writing of his intention to make an addition to his house two days before he commenced the work, whereby he had incurred the penalty not exceeding £20. The same defendant was also summoned for doing certain things contrary to the rules of the Act, as also for omitting certain things; and Mr. Sinclair, of No. 70, Euston Road, photographer, was also summoned for a similar offence. These proceedings were taken under the Metropolitan Building Act, 1855, and the subject of complaint was that both the defendants had erected at the back gardens of these houses, two buildings, each of two storeys, contrary to the provisions of the Act. Mr. Pimm, by not giving notice to Mr. Baker, the district surveyor of St. Pancras two days before his building was commenced of its area, situation, height, and intended use, had incurred a penalty not exceeding £20. In addition to that Mr. Baker complained that the buildings, which were two storeys high, 30 feet long by 10 feet wide, had been built entirely of woodwork and glass. What the defendants had done contrary to the rules of the Act was, that they had constructed the lower story of the addition open and non-enclosed, and had enclosed the upper storey with boarding and glass, and had also covered the roof externally with woodwork and glass, and what they had omitted to do as required by the Act of Parliament was to enclose the building with walls constructed of brick, stone, or other hard and incombustible materials, and to cover the roof externally with slates, tiles, metal, or other incombustible materials. Such being the case, Mr. Baker had served both defendants on the 4th of last month with a notice in writing, requiring them, as builders of the houses in question, to cause the things done contrary to the Act within 48 hours to be amended, and also to do the things which they had omitted to do; but the defendants took no heed of the notice—hence the present proceedings.—Mr. Ricketts, for the defence, said his clients would pull down the buildings complained of, if Mr. Baker would not ask for the infliction of the penalty. Mr. Baker said he would not give any understanding of that sort, and that the case had been proved. Mr. Ricketts said, he should contend that the additions or houses complained of were erected as greenhouses, and as such, did not come within the meaning of the Act under which his clients were summoned. Greenhouses were specially exempted by the Act. His clients had been to great expense in erecting these buildings, and he thought the readiness they had shown to remove them ought to be taken into consideration.—Mr. Baker said the buildings were not greenhouses, but had been erected for photographic studios. He would leave the question of costs in the hands of the magistrate.—Mr. Barker said he should make an order for the removal of the buildings complained of; and taking into consideration all the facts, should make no order as to costs.

To Correspondents.

WEAK PRINTING BATHS AND THE BRITISH JOURNAL. — Our Liverpool contemporary, referring to our reclamation, on behalf of a correspondent of the PHOTOGRAPHIC NEWS, of the origin of weak printing baths with nitrate of soda, and admitting the error of which he had been guilty, states that we have charged him with want of truth and honesty. Now, notwithstanding our dislike to editorial squabbles, because we prize truth and honesty very highly, we feel it necessary to say one or two more words on the subject. We distinctly disavow having made any such charge, and refer to the words we used as not conveying any such charge. In a captious notice of our YEAR-BOOK, commencing with an avowal of an intention to "be honest, even at the risk of being thought ill-natured," after pointing out some real or fancied errors, the editor made a claim, for one of his own contributors, as the originator of a process introduced several months earlier in the NEWS. This it was our duty to reclaim. In concluding our remarks, we felt it desirable to suggest to our contemporary that he would have been less likely to err in matters of fact had he been less beut, than he appeared to us to be, upon the captious detection of error; and we remarked that "when a person commences to write by avowing that he is going to be honest, even at the risk of being thought ill-natured, he is often in that frame of mind which will be sure of the ill-nature, without being equally sure of either honesty or truth." This is construed into a practical charge of lying and dishonesty. It meant nothing of the sort, nor do we wish it so construed. Whatever errors of taste, temper or judgment we have at times been unwillingly compelled to attribute to the gentleman in question, we should be sorry to impeach his integrity, or suggest the slightest conscious departure on his part from the course of an upright man.

W. V. A.—You may use a single lens for producing your transparencies. A portrait lens, with a properly placed Waterhouse diaphragm, will, however, render straight lines without distortion, which your single lens will not do. The want of coincidence between the visual and chemical focus may be remedied by a proper adjustment being made of the ground glass. Measure the difference between the visual and chemical focus, and then make exactly that difference between the plane of the ground glass and

that of the sensitive plate. 2. The toning of transparencies with chloride of mercury and sulphide of ammonium. If properly conducted, answers well. The use of the sulphide is to change the slightly blue black, which the mercury gives into a pure intense black. Chloride of gold should give a purple black, but is more expensive than the other process. 3. We do not know whether they are yet published or not. 4. Negatives for copying should be very full of detail; but it is possible to have them too thin. We will have pleasure in giving you our opinion of your results. 5. A bright transparent varnish is best. 6. Colours for tinting transparencies should be prepared purposely. See p. 107 of our 6th volume, No. 187.

L.—We should judge the spots to arise from defects in the paper.

Q.—The letter was inserted in virtue of the intrinsic value of the advice it contained, which, although trite and commonplace enough, was of that character which often requires to be reiterated. The names were struck out, because, whilst their publication might bear the appearance of puffing the chemists in question, they really added no one, as the letter bore no name. It is questionable whether, even with the endorsement of a known name, letters praising the wares of particular dealers should be published, but it is clear that to insert letters containing such lists of names, signed with initials or pseudonyms, would not only be comparatively useless as the recommendation of anybody, but would open the way to systematic and shameless puffery. When a man conscientiously, writes his goods attacked, writes in his own name an honourable letter in defence, the case is quite different. We personally hesitate to undertake the invidious task of recommending special houses, even when we hold a definite opinion, and personally should not hesitate to undertake the responsibility: how much more should we hesitate to publish such recommendations from persons alike unknown to ourselves and our readers!

Amateur.—We have heard very good accounts of the lens in question.

Somerset.—We should have no hesitation in recommending the English maker. The difference between the majority of French lenses and those of the best English makers is, that the former are made in large quantities and turned rapidly out of hand. The latter are each the subject of distinct examination and care by a skilled optician, who has a reputation to maintain, and who charges a price which enables him to guarantee a good instrument. Continental plate glass is, moreover, inferior to that made in this country, and many of the first continental photographers use the lenses of the best English makers, notwithstanding the higher price. 2. We cannot give you any certain information. Was the picture to which you refer an enlargement? If so, we believe it was by Disdéri.

Lilliput Beginner.—Better glass if convenient. 2. The printing sides will be of advantage. 3. Illuminate the print as in the dotted line. There is no work on the subject. The chapter in our Year-Book is the most extended we know. There are various stray articles, but that embodies the substance of the whole of them.

O. Ingred.—*Humphrey's Journal* is published fortnightly by J. H. Ladd, 60, White Street, New York, price 4d. each number. 2. We have not had sufficient experience with liquid colours to enable us to give our opinion. 3. Strengthen with nitrate of silver only. 4. If you use a quantity of iodine before intensifying, you will not find any difficulty in securing sufficient density. Or you may use the bichloride of mercury and iodide as you suggest. Your letter as it reaches us does not appear to be finished.

X. M. D.—We have examined the two extracts you forward, but do not perceive the descrepancy you wish us to reconcile. Each extract contains some matters not mentioned in the other, which was very natural in the condensed report of a conversational discussion recorded by two writers; personally that we do not see anything conflicting in the statements. If our correspondent will point out the especial differences he wishes elucidated, we shall be happy to help him.

Carolus S.—We do not recommend the use of carbonate of soda in the toning bath in the hands of persons inexperienced in its use. Two or three grains of carbonate of soda to each grain of gold are generally sufficient, and will often make a bath giving good results; but it will not keep as the gold is precipitated when the solution is made neutral or slightly alkaline.

A. Payne.—Mr. Rejlander considers his house a success, not a failure, and we have seen many fine pictures taken in it, notwithstanding of its success. You must not readily blame the omission of international courtesy, because an artist, absorbed in the pursuit of his own duties, does not answer letters of inquiry from strangers. Letter-writing to many persons is often a bore, and successful artists are very much overwhelmed with such inquiries, and they are sometimes driven, in self defence, to a disregard, which is erroneously attributed to discourtesy.

Photographer.—Add the precipitate to your other residues for reduction to metallic silver. 2. Citrate of soda not only precipitates chloride of gold; a toning bath containing it will not keep therefore. The black powder is metallic gold, which you may collect carefully and reconvert into chloride of gold by *aqua regia*. You must either make just as much toning solution as you require, and use it at once, or use one of the many formulæ which improve by keeping.

T. Sanderell.—We do not know any method whereby you can protect a specific application of photography. You cannot patent an idea. It is very difficult to advise upon a hypothetical case.

C. S.—If you follow the instructions given in the chapter of the Year-Book to which you refer and properly you will not have any acidity. The instructions are to leave a little of the carbonate undissolved: all the water used is used, therefore, will be in combination with silver and the nitrate will be neutral and ready for immediate use.

J. A. L. Bath.—It entirely depends upon the purpose for which you require the instrument. 2. Mr. Ryde. 3. Triple crystallization of nitrate of silver only removes a fancied impurity, which, however, perhaps we cannot say, makes assurance of purity doubly sure. The same quantity of H must be used as of the ordinary re-crystallized. 4. We have not tried any of the compounds you name.

A Photographer.—The gummy-looking fine powder on the darkened paper is probably, as you suggest, a portion of the negative, from the plate not having been thoroughly cleaned. The effect is very curious.

Paris.—No. 45. We will attend to the matter on the earliest opportunity.

New Maker.—There are various modes of purifying nitrate of silver from the contamination with copper, by means of a mechanical operation. 2. We do not recommend, but there are some make a solution of it which renders it precipitable under certain circumstances. The longest method, we believe, is to precipitate under such circumstances, then dissolving the copper, and redissolve with pure gold. You will find full instructions in our 4th volume, Nos. 116 and 124.

A Negative.—Unquestionably it is wise to have the glass to the ground, or very nearly. Do not have the height of the roof less at the sides than 8 or 9 feet, and at the ridge not less than 12 or 14 feet. You will find the best hints we can give as to amount of glass, amount of opaque, &c., in the article to which you refer in the Year-Book. The modification, or adaptation to your own case, can only be made on the spot.

Onward.—1. It is desirable to keep all the materials used at a temperature of from 60° to 70° Fahr. 2. If the bath be super-saturated with the iodo-nitrate of silver the addition of carbonate of soda may add in precipitating a portion of it. 3. It is dangerous to put collodion near a stove. 4. Probably because the bath at first is not perfectly saturated with iodide, and therefore takes a little from the first few plates. 5. A solution of 25 or 30 grains to the ounce may be used. It requires care, or a portion of the image may be destroyed. Wet the daguerreotype all over first, apply the cyanide solution and watch carefully, having at hand a vessel of water into which to plunge the plate at the first appearance of the image being attacked. Practise on a waste plate first. 6. We do not find any enclosure. If your method works satisfactorily, continue it, but we don't like your toning bath. For best formulæ see our Year Book. 7. We do not like acetic acid in the printing bath. 8. Add a few grains of nitrate of silver to your distilled water, and let it stand some time in sunlight. That will oxidize and precipitate any traces of organic matter. 9. Common water, if tolerably pure, may be used for the developer. 10. Bromo-iodized. You may add a little of another bromo-iodized collodion to it with advantage for some purposes.

E. T. S. A.—We like the third in your list best, but believe all are good. In such a case we do not think it wise to seek a low price.

E. F. R.—The quantity does not appear to be very material. 2. A lens of long focus is valuable for card pictures. Its only disadvantages are slowness, and a tendency to want of brilliancy in the image in dull weather, from the great space of misty atmosphere between sitter and lens. 3. Dark blue and white.

James Cooper.—Your plan seems to be very good indeed. 2. Not ground glass; either clear glass or corrugated glass and blinds. 3. At the west end. 4. Glass not frequently covered with thin blinds.

Pumpey.—Our correspondent's difficulty illustrates a fact that we have often endeavoured to impress upon our readers, namely, that no formula is of universal application. The photographer requires an intelligent appreciation of principles, and then how to apply them to varying circumstances. Let your correspondent read and recent paper on "Iron Developers." Use half the quantity of bromide in the collodion, and a much weaker developer. We believe the lens you mention is very good, but not better than the others you name.

Several articles in type are unavoidably stand over.

Several Correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions previously acknowledged	314	9	2
Messrs. Ramsden and Co., Leeds	2	0	0
T. B. Johnson, Esq., Edinburgh	0	1	6
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T. Mann, Esq., Leeds	1	1	0
A. H. Clarke, Esq.	0	2	6
			4 6 6
			347 3 2

Photographs Registered during the Past Week.

Messrs. Bullock Brothers, Leamington,
Photograph from Life, entitled, "Nearing Home."

Mr. W. H. Barnes, 28, Triangle, Clifton,
Photograph from a Painting by Mr. Simmons, entitled, "The Intruder."

Mr. John Charles, Brook Street, Chester,
Photograph, Three-fourths View of Monument over the Family Vault of Robert Frost, Esq. (Mayor of Chester), in Chester Cemetery.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 288.—*March* 11, 1864.

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THE PHOTOGRAPHIC EXCHANGE CLUB.

We have received many intimations recently of a desire on the part of some of our readers to re-establish, on some simple basis, a system of exchanging photographs. For reasons which we explained a few months ago, it was found desirable to suspend the arrangement then in operation, and which had been tried for two years. The general desire seems now to be that a further trial should be made of the plan in operation two years ago, before the re-organization of the club. The method originally proposed simply consisted in our publication of the names and addresses of all persons desirous of exchanging contributions, and it was understood that any gentleman receiving from a member of the club certain pictures, would make a return of others, to the best of his ability, equal in quality to those he received, the exchange being thus conducted without the necessity of entering into correspondence. For reasons into which it is not now necessary to enter, a modification in this system was found desirable; and a condition was made, that before any gentleman's name could be entered on the exchange list, he must send examples of the works he intended for exchange to the Editor of this Journal for his approval, the insertion of the name in the list being intended as an assurance to other members that a certain standard of excellence had been attained by the applicant.

We now, in deference to the wishes of our readers, intend to revert to this system, with some slight modifications. Photographers desirous of availing themselves of the opportunity of exchanging their productions for those of other photographers must forward to us examples of their works. It is not necessary that we should see prints from every negative from which they may desire to print exchange copies, but just such as afford a fair average of their work. When a sufficient number of names have been received, they will be published, with the addresses, in our columns; and fresh lists will be published from time to time, as may be found necessary. We propose, on publishing the names, to divide the list into three classes for convenience,—

First.—Those who desire to exchange large pictures, specifying size. These pictures should always be sent unmounted, packed on rollers.

Second.—Those who desire to exchange stereoscopic and card pictures only, unmounted.

Third.—Those who desire to exchange stereoscopic and card pictures, mounted.

It would be somewhat difficult to establish a scale of relative value for absolute observance, as the same number of square inches divided over two pictures generally cost more in production than when in one picture. For this, and equality of excellence in pictures returned, we must trust largely to the sense of justice in members, as nothing but a delicate feeling of honour can ever make such a system work satisfactorily. At the same time, to meet difficulties which will occur in connection with this part of the subject, we suggest that members have the power at all times of declining further exchanges with members whose productions are uninteresting or inferior, and that they should be at liberty, without any offence being understood, to return any picture sent for exchange which they consider much inferior to the pictures they intend as their own exchanges.

There are a few other suggestions we would make. Let every member make it a point to send out the very best prints he can produce. Let all unmounted prints be untrimmed. Let each print bear on the margin, or on a strip of paper accompanying it, the name of the photographer; the name of the subject; the lens, focus, and aperture, with which it was taken; the process used; the exposure, time of day, time of year, and quality of light; the strength of printing bath, and method of toning; together with any other interesting particulars relating to the picture. If this system were carried out with rigid care and honesty, the members of the club would gradually acquire a store of practical information for their guidance, which would not be less valuable than varied, and a choice accumulation of photographs in their portfolios. We shall publish a list of names as soon as we have received a sufficient number to make an efficient beginning.

JOTTINGS FOR MARCH.

FROM THE MENTAL SKETCH BOOK OF A PHOTOGRAPHER'S ASSISTANT.

To uphold the dignity of photographic art, and crush fallacious theories that cripple its progress, are the points always aimed at by Mr. G. Price, whose ably written articles and fearlessly rendered arguments have, on more than one occasion, excited within us the highest feelings of admiration, that bid us pay a passing tribute to genuine talent and sterling honesty. More particularly do we thank him for a quotation, which we had not seen, but for his recently published letter. The quotation referred to emanated, we presume, from the pen of the editor of a scientific journal; and is as follows: "The addition of nitrate of soda to the printing bath is one of those absurdities which unscientific photographers indulge in." Now, seeing that our benighted pen has ofttimes been employed in advocating the claims of nitrate of soda to a prominent position in the photographer's laboratory, as a matter of course, we deem it our duty to take up the glove so unceremoniously thrown down. The weapons we employ may be shaped after an unscientific model, but they have been subjected to practical tests that leave no room for doubting their quality or stability.

As a starting point, we would inquire when, and by whom, has a strictly experimental science been pronounced so com-

plete, that the labours of enterprising explorers may be derided as unscientific and ignorantly absurd? Or, if further research be legitimate, where may we trace the line of demarcation that separates the scientific from that which our learned friend pronounces "unscientific absurdities?" In a word, we propose a question which, wisely answered, would at once elucidate a clear and comprehensive reply to the whole of our interrogations. How may we define the boundaries that encircle the term science? Is it a series of mysteries that must needs be protected by a memory-racking nomenclature, and catalogued in ambiguous expressions, the interpretation of which can only be deciphered by the aid of the Urim and Thummim, held in possession by the learned few, who are thus empowered to submit laws by which Nature is reduced so completely under control, that any apparent truths that emanate from an observance of a certain phenomenon, which does not beat in unison with the accepted orthodox faith, must be regarded as unscientific absurdities, conjured up by the ignorant imaginations of uncredentialled pretenders? And if such be the case, from whence do the fortunate few derive authority that enables them to prescribe limits to the operations of nature, and place science within boundaries? We reply, the feeble mind of men will never grasp the embodiment in all its length and breadth of that short but mighty term, *Science*. It *was* when time was not: its *future* is eternity. A fountain is it where all may drink deeply, yet none be ever satisfied.

The aqueous vapour floating on the breeze stoops to kiss the mountain summit. In sportive glee, then leaps from crag to crag, to join the singing brooks, whose sinuous windings track a thousand widely distant paths, that lead them to the shore; when in noisy concerts joined, the murmuring song becomes a giant roar, that softens into gentle sighs, as each drop is in its turn massed with the deepened waters, whose tranquil bosom is enjewelled with the produce of a wide-spread world. No matter what the flag may be, the cry is ever welcome—free. 'Tis thus with science. In faint and ill-defined impressions, lie the seeds of knowledge, that germinate and flourish only under tender care; each tendril must be oft examined, each youthful branch be propped by repeated observation, and when its roots are spread and blossoms appear, its fragrance may be enjoyed by all. No matter by what name the plant is known. No matter if the lookers on wear not, *without*, the badge that marks the gardener. Science is knowledge, and knowledge is free to all who may pursue, but *never* reach, though we climb the mountain top, and watch awhile the droppings there; from thence follow the varied course that tracks them to the shore. Though we watch the tender seedling burst, still patient watch, until the upraised plant appears, the honest mind must still confess this knowledge to be a tracing out true ignorance. Then, if our present state of knowledge is but a feeble crutch to stay us in the stumbling path of ignorance, who shall dare pronounce an oft-proved fact to be contrary to laws, which at least are but little understood.

Resuming the quotation, we find appended to that before given the following sentence:—"*Primâ facie*, there would seem to be no advantage in it." Mark, "there would seem to be." On what ground is this indefinite assertion based? The wording of the sentence affords conclusive evidence that preconceived notions, rather than practical tests, were the foundation on which the gentleman in question built his singular remarks, and then, as a grand climax, he states his belief, that the advantages *said* to be derived from the use of nitrate of soda are but the wild fancies of non-chemical photographers; and then lifts up his hands to wonder how scientific men can be so foolish as to repeat so silly an experiment more than once. With all due deference to our scientific friend, we would fain ask him how any reasonable person could for a moment believe that deception like a plague should spread from town to town, creating like illusions among all its victims, making vigorous prints seem weak, and weak prints perfect? Were the editorial judgments biassed that examined the results of our recent comparative experiments? Are all who have borne testimony to the advantages derived from the use of nitrate of soda ignorant of all that lays claim to intelligence? Until such can be proved our scientific friend will fill, in the photographic world at least, an unenviable position. If we obtain the same results with 20 grains of silver as with 80: if, by the observance of certain laws, we bring our toning solutions under such control that a sheet of paper is toned with one-fourth the usual quantity of gold: if, by ignoring the doctrine taught by some of the apostles of science, we have ridded ourselves from most of the miseries of printing difficulties: then would we yield the honours to the scientific, and take our advantages and place in the more humble ranks of the unscientific, where we should be ever free from those whose ambition would fain lead them to frame laws for Nature. Resuming the quotation, we find a further wonderment, "how any man having pretensions to scientific aquirements can repeat such an experiment more than once is beyond our comprehension." It is then doubtless beyond his comprehension, because it is a flight beyond his scientific bounds; and it is because we lay no claim to scientific obligations, we have experimented again and again, have proved that a saturated solution with the disputed substance will clear the surface of albumenized paper in a twinkling: have convinced ourselves that a 5-grain silver solution will perform the same action; but by admixture (the silver with the soda), the destruction of the glazed surface is completely stayed. Ay, and our "unscientific" notions even went so far as to produce a decent print on the preserved albumen. Proceeding in our rebellious course, we tested results from 5 to 60 grains of the silver salt added to the saturated fluid, and found that, by adding the salt in a liquid form, the soda bore the presence of the intruder quite passively. From 5 to 50 grains, the advantages derived by the use of nitrate of soda were in our unscientific eyes, strongly defined; but beyond the last, named strength, the use of soda would appear a superfluity. Why? simply because nitrate of soda enables a small quantity of silver to effect what silver can do for itself when present in quantities that range from 50 grains upwards. And now, in concluding this subject, we would urge on our scientific friend to prove by practice, ere he judges by what things seem to be. For Nature, in her operations, oft starts a riddle, whose meaning doth abash the strong, but, like the willow, droops before the weak; and we would affectionately remind him that knowledge is science, and proved knowledge is a bright jewel, whose radiancy cannot be dimmed, although pronounced unscientific. We had prepared our sketch book for the reception of a little matter on the chemistry of weak printing baths in general, but having run the length of our cord, we close our book to resume our task, when fastidious April commences her career on the stage of fleeting time, and photographers are being wooed by her tearful smiles.

Note.—Although good results may be obtained with a smaller quantity of soda than nitrate of silver in the exciting solution, still, we are persuaded that the integrity of the albumen surface is best preserved when a large quantity of the soda is employed. No formula is necessary for its application, because even to saturation it may be carried without at all injuring results; indeed, with a very small quantity of silver, to carry it so far is an advantage, or at least, has so proved itself in our hands.

RESEARCHES ON POSITIVE PRINTING.

BY MM. DAVANNE AND GIRARD.

Chapter VI.—Toning.*

Spontaneous Modifications of Toning Baths; their Influence on the Practical Conditions of the Operation.

Our preceding researches have clearly established that the auriferous solutions charged with free hydrochloric acid should

* Continued from p. 7.

be excluded from photography, and that the toning baths employed ought to be either in a state of perfect neutrality, or after being rendered more or less alkaline, or when slightly acidified by a weak acid, such, for instance, as acetic acid. These researches have also shown how easy it is for the photographic artist to give to each proof such hues as he may desire, violet black, black or red, by employing, with discernment, baths that will satisfy one or the other of these three conditions.

After thus resolving in a general manner the practical question of toning, we now proceed to examine the modifications effected by time in the constitution of these different baths, and inquire if these modifications exercise an influence that may be taken into account in the regular mode of proceeding. Experience shows that they can; but it also establishes that the three classes of baths whose respective *rôles* we have specified, undergo various changes by the action of time; also, that the study of each must be made separately, even from this point of view.

1st. Let us first examine the baths brought to the state of absolute neutrality, and which we consider to be the normal method of toning.

If we take a gold bath formed of 1 gramme (15 grains) of the double chloride of gold and potassium dissolved in a litre of water (35¼ ounces), and if we throw a pinch of chalk in fine powder into the solution, and, after shaking the mixture for a few moments, we filter it, a liquid absolutely neutral of a light yellow colour is obtained. But it does not remain long in this state; if left to itself it becomes in about four-and-twenty hours quite colourless. A change takes place spontaneously in its chemical constitution.

This change is accompanied also with a profound modification in the toning qualities of the bath. At the time it was prepared, and while it was still yellow, it sufficed to leave the proofs in it for a few seconds for them to become toned; gradually the time necessary to obtain the same result becomes longer, and lastly, when the change is complete, it must be reckoned by minutes instead of seconds. And this is not all; the proofs obtained in the first instance are flatter and weaker than those prepared in the second.

If we seek the cause of this modification in the nature and effects of the neutral toning baths, we shall find it in this remarkable fact, that chloride of gold, $Au^2\ Cl^3$ brought to the state of perfect neutrality in presence of chlorides of potassium, sodium, &c., is spontaneously changed into a salt of the protoxide. To prove this, we have employed a strong test due to M. Fordos, and based upon the production of proto-iodide of gold $Au^2\ I$. M. Fordos has shown that, when we pour some drops of iodide of potassium into a concentrated solution of proto-salt of gold, proto-iodide, in the form of a yellow powder, is precipitated; but that the same test applied to a solution of per-salt of gold gives rise to a precipitation of free iodine, which imparts its brown colour to the iodide precipitated at the same time with it. In applying this test to freshly prepared toning baths, while yellow, and to old and colourless baths, or better, by substituting solutions much more concentrated for these two dilute solutions, we have seen the iodide of potassium give, in the old solutions, a bright yellow precipitate, and in recent solutions a brownish precipitate formed of iodide and free iodine. The distinctness of this test is such, that it suffices amply to characterize these two kinds of solutions, and to prove that the yellow persalt of gold, of which the bath is primarily formed, is gradually reduced to the state of colourless proto-salt.

It is easy to give a theoretical explanation to this reduction; the perchloride of gold $Au^2\ Cl^3$ is very unstable; it readily abandons the excess of chlorine it contains, provided that it encounters near it an oxydizable substance. Now, such is the condition of the chlorides of potassium, sodium, calcium, &c., which accompany it in the bath, under the influence of the perchloride of gold, $Au^2\ Cl^3$, and in the absence of all acid matter, these chlorides become oxidized, and pass to the state of chlorates, by a process absolutely analogous to that employed on a large scale in manufacturing chlorate of potassa, and which consists in treating chloride of potassium by hypochlorite of lime.

As to the influence exercised upon the toning itself by the reduction of the per-salt of gold to the state of proto-salt, or to speak in technical language, by the decoloration of the bath, it is equally easy to explain. It is only necessary to refer to §II of our Essays (Toning with Protoxide of Gold), to recognize that the quantity of gold deposited in a given time by a proto-salt of gold, is much inferior to that deposited during the same time by a per-salt of the same metal, From this results a necessary slowness in the operation of toning, when the bath is old and decoloured; the gold is deposited less quickly, because the proto-salt is more stable than the per-salt, and the toning is consequently slower.

But if the proof, to become toned, requires some minutes instead of seconds, it is also richer in hue, and more vigorous than if it had been obtained in a freshly prepared bath, containing gold in the state of perchloride. Practice proves it and theory explains it. For, when the toning agent is a maximum salt of gold, $Au^2\ Cl^3$, for example, the deposit of two equivalents of gold, Au^2, upon the proof, transforms three equivalents of silver, Ag^3, in the fixing agents, into soluble chloride of silver; when, on the contrary, the toning agent is a minimum salt of gold, $Au^2\ Cl$. the deposit of the two equivalents of gold Au^2 transforms only a single equivalent of silver, Ag, into soluble chloride in the fixing agents, and consequently the silver, either metallic or combined with organic matter, to which the colouring of the proof is due, disappears in three times greater quantity in the first case than in the second; hence a fading or weakening of the coloured parts when the bath is new, and an enriching, on the contrary, of the same parts when the bath, old and decoloured, has been brought to the minimum of oxydation.

The preceding considerations establish that the toning bath, neutral or normal, can, in consequence of the spontaneous modifications it undergoes, give rise to two modes of toning, the first rapid, weakening the proof a little when the bath is recently prepared; the second slow, giving more beautiful tones when the auriferous liquor is spontaneously decoloured. It is for the photographer to choose, according to taste, which of the two he prefers.

We must, however, insist upon the advantages presented by the second of the two methods indicated above; these advantages consist not only in the greater beauty of the hues obtained; to this quality must be added the possibility of the bath retaining the property of toning proofs almost indefinitely. If the photographer wishes to work rapidly, by working with baths freshly prepared, he must, as soon as the activity of the bath slackens, throw it away among the residues; but if he prefers the slow toning with the decoloured neutral bath, he will never have any occasion to throw away the auriferous solution; it will only be necessary to add to it after each operation the quantity of gold the proofs have removed from it, in order to maintain it always in a state suitable for fresh tonings.

The determination of the quantities of gold which the photographer may thus add to his bath, to preserve to it an almost indefinite continuity of action, cannot be fixed absolutely; too many mechanical causes intervene to modify, more or less, the proportions of gold removed by the toning of each proof; still, we can indicate them in an approximative manner.

The quantities of gold deposited upon each sheet during the operation of toning are very inconsiderable, as we may be convinced by examining the results of our analysis; at the most they attain 0·020 of a gramme, upon a sheet measuring 44 by 75 centimetres (18 by 30 inches), darkened over its entire surface; and as generally, in an ordinary proof, the total of the light parts may be considered as equal to the total of the darkened parts, it is fair to admit that, upon a proof of this kind, the quantity of gold deposited, does not exceed half the quantity stated above. Each sheet of 44×75, will therefore remove from the bath by toning only 0·010 gramme of metallic gold: but to this chemical cause of weakening must be added another, mechanical, which must be taken into account. Each sheet is wet when placed in the bath, and it adds water to the bath: but while it brings pure water, it takes away gold solution. Experience proves that a wet sheet of paper upon the surface of which the water still flows, but from which it escapes only drop by drop, carries off about 10 to 15 cubic centimetres of the liquid into which it is immersed. Each sheet then removes from the toning bath the quantity of gold contained in these 10 to 15 cubic centimetres, and this quantity must be added to that removed normally by the chemical operation.

Now, the bath being made, for example, of the strength of 1 part of double chloride of gold and potassium, to 1,000 parts of water, these 10 to 15 cubic centimetres remove from the bath 0·010, to 0·015 gramme of the double salt. On the other hand, the 0·010 gramme of gold deposited by the toning corresponds to 0·021 of double chloride of gold and potassium. Then each sheet of

44×75 removes from the bath about 0·030 gramme of auric salt. And this is the quantity that must be added to the bath after toning each sheet to maintain it in a suitable state of strength. A very simple way of arriving at this, consists in placing beside a bath working continually a solution of the same nature, but much more concentrated, containing, for example, 3 grammes of thod oublo chloride of gold and potassium per litre. Such a solution contains 0·003 of double salt per cubic centimetre, and consequently the quantity removed by each sheet, 0·030 gramme, will be found contained in 10 cubic centimetres. Then, when the toning of a certain number of proofs is finished, it will be sufficient to add to the weakened bath as many times 10 cubic centimetres of the solution, neutral and decoloured, at 3 per 1,000 as sheets measuring 44×75 have been passed through it. We shall thus obtain a bath which will work constantly, without altering, and which it will never be necessary to throw among the residues. But we must again repeat, that the numbers we have given are only approximative; absolute indications cannot be given for the greater or lesser intensity of the proof, even the greater or lesser porosity of the paper will necessarily cause a variation in the quantities of gold removed from the bath. Besides, it will always be easy for the photographer either to strengthen his bath by adding a greater quantity of the solution of 3 per 1,000, or to reduce it by the addition of a little water.

(To be continued)

ACTION OF LIGHT UPON NITRO-PRUSSIATE OF SODA.

BY M. L. ROUSSIN.

The new method we propose for measuring the luminous intensity of the sun's rays appears to us to be more exact, and especially more rapid, than any of those hitherto proposed. It is founded upon a special reaction we discovered several years ago, and which recent circumstances have induced us to study more carefully.

A limpid solution of nitro-prussiate of soda is decomposed by light, and deposits a precipitate of prussian blue. A paper impregnated with this solution, then dried in the dark, when exposed beneath an ordinary negative, will yield a blue proof which is fixed by simply washing it, and removing the salt in excess. The quantity of prussian blue formed is in proportion to the intensity of the light, and in direct ratio with the surfaces solarized, as we have proved by several direct experiments. This reaction is very decided, but it is slow.

By its mixture with a persalt of iron (perchloride or persulphate) the solution of nitro-prussiate of soda acquires the property of decomposing more rapidly under the influence of light, while retaining its other properties, particularly its ordinary stability. The following proportions give good results:—

Nitro-prussiate of soda	2 parts
Perchloride of iron, dry	2 „
Water	10 „

When dissolved, filter the solution and keep it in a bottle covered with black paper. This solution is so sensitive that an exposure for a few minutes to solar light communicates to it an intense blue hue, and gives rise to an abundant precipitate of prussian blue.

We proceed to inquire what are the most convenient means of estimating the proportion of prussian blue formed, and consequently to judge of the luminous intensity of the chemical rays. The following method is in our opinion the most rapid and exact: it consists, 1st., in preparing a certain quantity of the solution above indicated, and to take exactly, with a very sensitive areometer, the density of the liquid at the ordinary temperature of 60° F. The density first obtained, not varying, is inscribed on the bottle.

2nd. To select a test tube which can be tightly closed by a good cork or glass stopper. Fill it with the solution and expose it to light in a uniform position. When the experiment is concluded, withdraw it into a dark room, and again take the density by immersing the areometer in it. It is evident that the deposit of a certain quantity of prussian blue must be accompanied by a proportional diminution of the density. If the temperature of the liquid differs from that of 60°, we wait until it has acquired that temperature before taking the density. It is easy to make a table of corrections for taking the density at any temperature. Various practical experiments of this kind have enabled us to see that the indications of this process are comparable, and of great sensibility.

The employment of the areometer simplifying the operation of ordinary exposures, gives to the operations all the rapidity of ordinary meteorological observations. We think also, that this method may be generalized, and advantageously applied to every other photo-chemical reaction.

Upon proposition 1, we have established a very simple *method of opposition*, which permits of the measuring, by a single reading, the initial electromotive force of any element of resistance.

Upon proposition 2, we have established a very simple method which permits of the establishing of the relation between the electromotive force of a pile, the total resistance of the circuit, the chemical work accomplished, and the heat disengaged.—*Les Mondes.*

ON A CASE OF PHOTOGRAPHIC INSENSITIVENESS.

BY C. OMMEGANCK.

New formulæ, which tend to effect some favourable innovation in the preparation of collodion or the developing solution, generally excite sufficient interest. But we now undertake to describe an operation that deprives these compounds of the faculty of producing a photographic picture, which certainly no operator has sought to effect. This communication appears to us to present a certain interest in researches upon the formation and nature of the latent picture; it is therefore addressed to theorists and experimentalists, who are occupied with this question.

Take a collodion, prepared according to any formula, and iodize it with a suitable proportion of iodine, and then immerse in it a plate of zinc and a platinum wire, united to each other by their upper ends: the iodine is rapidly absorbed to form iodide of zinc; when the collodion has become nearly colourless, and is employed in the usual manner; it yields no picture. Any iodized collodion, through which this kind of electric current is passed, exhibits the same peculiarity. Why?

Prepare a developing solution with sulphate of iron, according to any formula; take a quantity of water, but, instead of adding it to the sulphate of iron, introduce into it an equivalent of sulphuric acid, corresponding to the quantity of sulphate employed; then immerse in it an iron wire and a platinum wire, united at their upper ends; the operation is concluded, when the disengagement of gas ceases at the platinum wire, and all the sulphuric acid converted into sulphate: then add the requisite quantity of alcohol, acetic acid, &c., according to the formula adopted. This iron bath is wholly unsuited to yield pictures; it will not develop at all. Why?

Note by Dr. Van Monckhoven.—These experiments are very interesting, and confirm the idea, that the action of light upon surfaces covered with iodide of silver is purely physical. Certain bodies, such as iodide of ethyl, deprive collodion of its sensitiveness, and in Mr. Ommeganck's experiment, a compound of this nature is probably formed. As to the experiment with sulphate of iron, it is still more curious, in a scientific point of view; and it appears to us, as it does to M. Ommeganck, wholly inexplicable. I intend, however, to repeat the experiments of our ingenious friend. —*Bulletin Belge de la Photographie.*

WEAK OR STRONG SILVER BATHS: WHICH ARE BEST?

BY JABEZ HUGHES.*

The proper strength of the nitrate of silver solution, for sensitizing albumenized paper, has recently been engaging the attention of photographers. I should like to hear the opinions of the members of the Glasgow Society on the subject, as in former years they were advocates of the strong solutions. Mr. Stuart, in his paper read before you, recommended 90 grains, and in a subsequent paper named 100 grains. Mr. A. Robertson in his paper also gave 90 grains as the best strength. Mr. Macnab, if I remember rightly, adhered to this strength, and these gentlemen, clever photographers as they are, carried the feeling of the society with them. Since these papers were published, time enough has passed either to confirm or modify these ideas. You are aware that recently there have arisen advocates for weaker solutions, who name 20, 30, or 40 grains per ounce as sufficiently strong. It is very kind of these gentlemen to publish their opinions, and to expostulate with their brother photographers, for granting that all the silver residues are collected, still the curtailing the use of so expensive a salt as nitrate of silver is a subject that comes directly home to us all. Yet the economical use of nitrate of silver is not the most important thing, the primary point is the excellence of the print. Can as good photographs be produced by a 40 grain, as by an 80 or 90 grain solution? The question is apparently not difficult to solve, it is simply a matter of fact, yet testimony varies considerably among men fully qualified to judge.

Every one who has seen Mr. England's work will acknowledge him as one of our cleverest photographers. He is issuing just now a splendid series of stereographs, Swiss and Alpine scenery; the negatives, taken last summer, are irreproachable, and the prints are equal to the negatives. These prints are all sensitized on a 40-grain silver bath. A short time since he increased the strength, but the prints though more sensitive, were not quite so good; the shadows were not so clear, and the details scarcely so perfect, and he returns to the 40 grains.

At a recent meeting of the London Photographic Society, Messrs. Sedgfield and Eliot exhibited a portfolio of good prints all produced on a 40-grain bath, and these gentlemen conduct a very extensive printing establishment. Another of our ablest photographers, Valentine Blanchard, has given in his adhesion to the weak baths, using even a 30-grain one. Mr. Taylor, of Edinburgh, has earnestly advocated this side of the question, and has surrounded himself with much confirmatory evidence, and many other gentlemen whose testimony is entitled to the highest respect have recorded similar experience.

And yet, satisfactory as this evidence may be, it cannot be held to be perfect, as on the other side, there are as pertinacious advocates of the strong silver baths. A few evenings since, I asked Mr. St. George, the proprietor of a considerable printing establishment, his opinion, and he declared the weak silver baths to be quite a mistake—that the prints were weaker in quality, slower in printing, and more difficult to tone. Mr. Robinson, of Leamington (and of the high quality of his work you are well aware), says his printers must have a 60-grain bath, or he cannot get good prints from them. Mr. Alfred Harman, a careful, painstaking photographer, has undertaken a series of experiments, which he exhibited at the North London Society, and he found that with prints sensitized on varyingly strong solutions, from 10 to 160 grains per ounce, the vigour and brilliancy was just in proportion to the increased strength of the silver solution, the weaker baths yielding bad, and the strong baths good prints, from the same negative. On the same occasion, Mr. Henry Cooper, an excellent photographer and most intelligent experimenter, narrated his experience on baths varying in strength, from 40 to 90 grains, giving his verdict in favour of the stronger solutions.

How is this conflicting testimony to be explained? Can they both sides be right? I am inclined to think they may, and I think the explanation is to be found in the varying practice and tastes of individuals, and particularly in the different kind of negatives they employ.

Referring to my own practice, I confess that although some years since, I satisfied myself in favour of 60 or 80 grains, yet hearing so much in favour of the 30 or 40 grain solutions, and especially after seeing the brilliant prints obtained by Mr. England, I went through my experience again, employing a 40-grain bath. Less than a week's experience convinced me that the change was much for the worse; that the prints were weak and feeble; that they bleached in the toning bath, and refused to take a good tone; that they were slower in printing, and required much more over-printing. While, however, the general tone of my prints was deteriorated and debased, I observed some few of the prints were better than had previously been obtained from the same negatives.

I may here mention in explanation, that my ordinary style of negative, compared with many photographers', is weak and thin—that I aim at softness and delicacy, rather than vigour and power. Here is the explanation of the deteriorated quality of my prints with the weak baths—there was not enough free nitrate of silver present to reduce in the shadows before the high lights were printed through.

The prints that were improved were from hard and wiry negatives, short of exposure and over-developed, that usually gave bronzed shadows and chalky whites. With the weaker solution, the tendency to bronzing was reduced, and the violence of contrast lessened; and thus the pictures were improved. On doubling the strength of my silver solution, the customary character of my prints was restored, and to that strength, 80 grains, I steadily adhere.

The moral of my experience is nothing new; every one of an experimental turn must have passed through it, viz., that all the parts of a process must be balanced in harmony with each other; that the strength of the silver solution must be adapted to the vigour of the negative—a strong solution to a weak negative, a weak solution to a strong negative, not forgetting the modifying influence of the light, sunshine or diffused, used to produce the print. Mr. England's negatives, intense and full of contrast, are injured by a strong silver solution; whilst mine, weak and thin, are improved by it. With these ideas, then, I can easily understand a gentleman declaring that he sees no use in strong silver solutions, and that he can produce as good, or even better, prints from a weak bath. I can also explain and sympathize with another who acknowledges his failure.

Again, one person likes a showy, brilliant print, and he will naturally prefer the strong solution best fitted to produce it; while another likes a quieter, softer picture, and will incline to the weaker solution. Hence, I conclude that there is no universal strength of solution to be adhered to; that a strong or a weak solution depends for its proper use on other modifying conditions. I should be the last to maintain that good pictures could not be produced on a 30-grain bath; nay, more, I can readily believe that better prints may be obtained under some circumstances, or from some negatives, than from a much stronger solution. Yet it would be a mistake therefore to proclaim a 30-grain bath as right and proper under all circumstances. In my own experience, as already detailed, I know I do best with an 80-grain bath; but if I alter my practice, and produce a much more dense negative, then I am sure I can use a weaker bath. My impression, then, is, that each person should work out, in his own experience, the strength of silver bath that suits his own negatives, and the paper he generally uses, and let that be the guide for himself.

There is another aspect of this question—the increased sensitiveness communicated to the paper by the strong silver solutions. This will, perhaps, more affect the professional than the amateur. Mr. Mayall declares that, with the use of

* Read at a meeting of the Glasgow Photographic Association, March 9th.

a highly salted paper and strong silver solution, 100 grains to the ounce, his printers can produce, in the same time, at least twice as many prints from a given negative, as from ordinary paper and the usual strength of silver. Thus orders for large quantities can more readily be produced in a limited time, a matter often of vital consequence to the professional printer. Viewing it from this point, Mr. Mayall maintains that it is the strong baths that are the really economical ones, as, all residues being collected, the increased cost of nitrate of silver is as nothing compared to the greater number of prints produced in a certain time.

I have already mentioned Messrs. Sedgfield and Eliot as working with a 40-grain bath, and exhibiting prints produced by the same. I questioned Mr. Eliot the other day on this subject, and got some curious evidence; and a more intelligent and skilful printer than Mr. Eliot I am sure there is not.—"Do you always use, then, a 40-grain bath?" "Oh dear no! we only use the 40-grain when it is bright: we adapt the strength of the silver to the brightness of the day. I strengthen the silver every morning for the paper to be used during the day: if it looks like a bright day, I let the silver be 40; if it be dull, I make it 50 or 60; but if foggy and misty, as it has been lately, I use 70 or 80. If we used 40 grains on these dull days, we should not get through any prints, because it is so slow. It is only in bright weather that 40 grains is sufficiently quick."

I now leave the matter with you for discussion. The ideas given forth are, I consider, some explanation of the diversity of opinion existing about the desirable strength of the silver bath. I imagine that the advocates of weak and strong solutions may each be right—truth is many-sided—and that, like the celebrated square pegs and round pegs, they only require to be put in right-shaped holes to work in harmony. I shall be pleased to hear the verdict given by your eminently practical minds, for I am sure it is a subject on which the members will be full of information.

While the subject of printing is under your consideration, let me commend your attention to the specimens forwarded by Mr. Wharton Simpson, of the Swan's carbon process of Mr. Swan, of Newcastle. All the examples of prints in this material have hitherto, compared with silver prints, been spoken of with qualification. For the first time we see carbon with all the delicacy and minute beauty of silver. Mr. Pouncy has been very persevering, and, in his recent things, he has made great strides of improvement; but Mr. Swan is a long way ahead. "Coals from Newcastle!" wherefore not a perfect carbon process too? We look with deep interest for the details of the method, which the inventor is going to describe at the next meeting of the London Photographic Society. Are we indeed on the eve of having a perfect printing process?

CHLORIDE OF LIME TONING; HOW TO SUCCEED WITH IT.

BY WILLIAM A. TERRY.*

I would like to say a few words to those artists who have had trouble with the toning bath made with chloride of lime; I consider this bath to be superior to all others, and easily managed when the principles of its action are understood. Most of the published formulæ recommend a saturated solution; chloride, or rather hypochlorite of lime, is a deliquescent salt, and always contaminated with hydrate and carbonate, consequently a saturated solution cannot be obtained; and even if it could, it would be so excessively strong as to make it difficult to proportion it. Many suppose the action of this salt to be due to the lime; the same effects can be produced with the hypochlorite of soda or any other alkaline hypochlorite. It is the acid of the salt in all cases which modifies its action. The peculiar effects of the toning bath made with biborate, bicarbonate, acetate, and phosphate of soda, illustrate this principle. The great difficulty in the way of any formula for this bath is, the unstable nature and the uncertain strength of all the hypochlorites; consequently it is necessary to understand the principles of its action, and to regulate the strength of solution by the working of the bath. I use the chloride in connection with the phosphate of soda, and think it gives more pleasing results than the chloride alone. I make a solution by adding an ounce of fresh and dry chloride of lime to one pint of water.

In making my toning bath I dissolve one drachm of phosphate of soda in one quart of pure water, then add half a drachm of saturated solution of bicarbonate of soda; when mixed, add two grains of neutral chloride of gold, stirring constantly; let it stand in a warm place for two or three hours, then stir in two grains more of gold in solution; when thoroughly mixed, add a half-drachm of the above solution of chloride of lime. The lime is instantly precipitated as insoluble phosphate, leaving hypochlorite of soda in solution. Set it in a warm place for two or three days; the lime will settle, leaving the solution beautifully clear and brilliant. It should now be in working order, but it is as well to let it stand a week before using. The prints should be carefully washed before toning, for although free nitrate of silver on the print does not injure it very materially, yet it soon hurts the bath, changing it from its original clearness to an opalescent and milky state, when it does not perform as satisfactorily. Should the bath now cause mealiness, the chloride was too strong, add more gold and allow it to stand a day or two longer, or a week or two longer without any addition, and it will come out all right.

There is no loss in using more gold in the solution, as none of it is ever deposited from this bath when in order. I have allowed it to stand for months without a trace of gold being deposited, although all other baths lose more or less in standing over night. If, on the contrary, the bath tones too rapidly, causing light prints to lose their brilliancy, add more chloride of lime, and allow it to stand a few hours before using; it should be remembered that the toning compound of hypochlorite and gold is very slowly formed, and when formed, is very permanent.

The precise proportion of phosphate is not very material, provided there is an excess of alkaline salt, as it interferes with the brilliancy of the result. A sufficient amount of gold (about one grain for every sheet of paper), and also of chloride and phosphate if necessary, should be added to the bath every day after using, to keep it of its original strength. With care this bath will remain in order a very long time. I have one now in use, which has swelled by constant use from a quart to nearly a gallon, and is still clear and in good order.

This bath produces the most brilliant colours of any I have heard of, and works well with any kind of paper. I send you a few prints that you may compare with others. All excellence is comparative, and one man will grow enthusiastic over a success whose results are inferior to another's failures. These prints were silvered on a solution, the formula of which I sent and you published some months since. The solution was originally made forty grains to the ounce, and has been replenished by a solution of the same strength, contains about one quart, has been in constant use for months, and silvered paper for several thousand prints, and is now as clear and colourless as the day it was first made.

An artist some time since complained in your journal of mange or leprosy in his prints. There are only four causes which can produce any such results; the first is in the paper, when the albumen has not been well beaten, and shows in reddish streaks and spots, or a general mealy and pimply appearance; this can be remedied by long fuming, but such paper was worthless, one of the vignettes I send was made on such paper; the second is a shallow and spotted appearance, particularly in the shadows, and is caused by the

* From the *American Journal of Photography.*

paper being removed too soon from the silvering bath; the third is mealiness, and is produced in the toning bath in consequence of its not being in good order, and it is aggravated by poor paper, insufficient fuming, &c.; the fourth is the measles proper, and is caused by removing the paper from the hypo before the silver is entirely dissolved, and appears as brown or yellowish dirty spots and specks, and can be seen more plainly by looking through the paper. The cause of either of these defects can be determined by the practised experimenter at a glance, and if any one has anything of the kind which was not produced by one or the other of these causes, I should be glad to see it. When experimenting on any such trouble, it is best to try to produce the defect in its greatest perfection, and when you have thus discovered the cause, it is easy to apply a remedy.

In toning prints it is necessary to be very careful that the toning bath does not get contaminated with hypo from the fingers, &c.: the smallest trace of it in the bath will cause yellowness; acid chloride of gold should never be added to a chloride of lime toning bath; the reason of this will be easily seen from the following formula for bleaching solution for over-printed plain photographs:—To four ounces of toning bath of chloride of lime, add one drachm of acid used for dissolving gold (nitric acid, one part, muriatic three parts) and a half-drachm of solution of chloride of lime of the strength recommended for toning; the solution instantly turns of an intense golden yellow; one ounce of this solution added to a pint of water will bleach a very dark plain print in a few minutes. If it bleaches too rapidly, dilute with water; if it causes mealiness, add more gold. This should be used only after the prints are fixed and washed. A print which is so dark as to be entirely worthless, can by this process be made very good, in fact, with some negatives it produces the best possible results. The proportion of acid may be varied according to circumstances.

The above will make a very powerful solution, capable of bleaching the darkest print entirely out in a few minutes; it will not injure the purity of the whites in the slightest degree, and does not produce mealiness if rightly managed.

I have used this solution for several years, and am not aware that it has ever before been made public. It does not answer very well for albumen prints. At some future time, if agreeable to you, I will give you my ideas concerning the iodic and organic compounds formed in the collodion bath by long use, and the result of my observations on them, in hopes that some chemist who has more time at his disposal than I have, may be induced to investigate and discover some better remedy than the tinkering and doctoring methods now in use, or the troublesome process of decomposing and reforming the nitrate.

A NEW DEVELOPER.—TIME OF EXPOSURE SHORTENED.

BY P. C. DUCHOCHOIS.*

Probably the next step in photographic progress is to find an agent whose instability is such, when in presence of silver salts, that a very small amount of exposure will be sufficient to develop the latent image, which is certainly formed on the first instant of the exposure, but which no re-agent known is able to bring out, owing to its power of stability, which prevents the rapid reduction of silver salts acted upon by light, and consequently the development of the latent impression. This is now much studied here and abroad, and I think I have found a developer which, far from settling the question, is perhaps a step towards the desired end.

I do not pretend it is an entirely new compound used in photography, for each of its constituents has been employed separately or associated, but not, as far as I know, combined altogether in the following manner:—

Sulphate of protoxide of iron	...	480 grs.
Water		17 fluid oz.

After complete solution, one drachm of aqua ammonia fortis is added. By decomposition a double sulphate of iron and ammonia is formed, oxide of iron is precipitated and afterwards converted into acetate by addition of acetic acid in excess (3 fluid ounces, No. 8).

With this developer I found that the time of exposure is about one-third less than by the single sulphate of iron, and that the intensity of the negative is always sufficient, the half-tints well preserved and the shadows clear.

However, if the collodion is made of powdery pyroxyline, prepare in strong acids at a high temperature, partly converted into nitro-glucose, and consequently giving great intensity; if the silver bath contains sugar of grapes, glycyrrhizine, or those organic matters, not well defined, resulting from use and giving like results, especially when the bath has been boiled to drive out the alcohol in excess; then the intensity will be exaggerated, the negative white and black, and even a slight reduction known as "veil of collodion" will often be the result. But with a collodion of that kind that gives little intensity and great sensitiveness, indeed the most perfect negatives are obtained in a time of exposure excessively shortened.

Many photographers who will try this developer will complain of its tendency to fog; it must be borne in mind that the greater the instability of the developer when associated with nitrate of silver, the purer must be the material to avoid fogging. For example, every one knows that a silver bath giving a general reduction with sulphate of iron as a developer, will, however, give clear negatives if pyrogallic acid is substituted; for the salts of iron are more unstable than pyrogallic and gallic acid. So it will be with the energetic developer, and fogging is sure to happen if the silver bath is in such condition as to give a veil, either when the plate remains some time in it or by long exposure.

[Mr. Mattheson, Mr. Blanchard, and others in this country have proposed a similar method of adding ammonia and acetic acid to the iron developer, by which a portion of protacetate of iron is formed. Their object has been to obtain intensity rather than rapidity. On p. 512 of our last volume, a method by M. Gaudin is given, in which carbonate of soda is used in the place of ammonia.—Ed. P. N.]

* From the *American Journal of Photography*.

COPYRIGHT.

When Mr. Black asked if the Government intended to bring in a Bill to consolidate the laws of Copyright in Literature and the Fine Arts, Mr. M. Gibson replied in the negative, "*because circumstances had not arisen to render such measure of urgent necessity.*" Mr. Black thereupon stated his intention to move for leave to bring in a Bill for the purpose of such consolidation,—which he has since done.

Mr. Milner Gibson's answer reminds us of those Athenian public men so constantly and earnestly exposed and reproved by Socrates for confidently expressing opinions upon subjects they did not understand. To affirm that the measure in question is *not* "of urgent necessity," is the less excusable upon the part of the President of the Board of Trade, because few public men are gifted with greater powers, both natural and acquired, of mastering any subject. A very little time devoted to that in question will satisfy any reasonable person that the consolidation and amendment of our copyright statutes has long since become an act of *justice*, and therefore "of urgent necessity." The subject is far larger and of much deeper importance than is generally supposed. These laws include the only protection for the whole copyright property existing in the British dominions; and by conventions entered into by the Crown, about *eighty millions of foreigners* are directly and expressly interested in our laws of copyright. As they stand at present, they are a complicated, illogical mass of confusion and injustice.

Dividing the existing statutes into two groups, municipal and international, we have about three-and-twenty Acts of Parliament, which together form a bulky volume. One of them dates as far back as 1734. That which ought to and

might easily be made most simple and efficient is now a verbose maze of inefficiency. If any one be disposed to doubt this assertion, let him take the trouble to collect and analyze the Copyright Acts, and he will find that we have rather understated than exaggerated their defects. The effect of the process will be heightened by comparisou with the really efficient French and Prussian codes of copyright, which are printed in a few octavo pages. In truth, no one can form a just opinion of the clumsiness and inefficiency of our legislation upon copyright without comparing it with that of foreign states, and especially those with which England has entered iuto International Copyright Conventions. They now include France, Prussia, Italy, Spain, and nine other minor states. The object of these conventions is, for example, as to works *first published* in France, to protect the copyrights thereof in the British dominions, and *vice versâ* as to works first published there. All these treaties are based upon the principle of *reciprocity*. Apart from any question of policy or justice as regards British subjects, surely it has become a moral obligation upon the part of this country to consolidate and amend our laws of copyright so as at least to afford foreigners, being subjects of the states with whom England has entered into copyright couventions, that protection for their copyright property in the British dominious which British proprietors of such rights enjoy under French and other foreign legislatiou. As the matter stands, French and other foreign publishers openly and bitterly complain of the gross injustice existing under the copyright conventions with England in consequence of the imperfection of our legislation. No man who nnderstands the subject can doubt the justice of these complaints.

Apart from the necessity of an amendment of our legislation upon copyright, the present complicated and dangerous state of things in Europe likewise renders it essential to remedy an omission in our copyright conventions. Not one of them contains any clause for the continuance of the treaty in the event of *hostilities* arising between the parties thereto. The result of this omissiou is, that in the event of war breaking out, for example, between England and Prussia, our copyright convention with that state would, by such war, become anuulled. Upon this point the celebrated American jurist, Chancellor Kent, says:—"As a general rule, the obligations of treaties are dissipated by hostility. But if a treaty contains any stipulations which contemplate a state of war, and makes provision for such an exigency, they preserve their force and obligation when the rupture takes place." The learned author, in support of this proposition, cites an article in the treaty of 1794 between England and the United States of America, whereby "it is provided that debts due from individuals of the one nation to those of the other, and the shares or moneys which they may have in the public funds, or in public or private banks, should never in any event of war be sequestered or confiscated." He concludes by saying,—"There can be no doubt that the obligation of that article was not impaired by the war of 1812, but remained throughout the war, and continues to this day, binding upon the two nations, and will continue so, until they *mutually* agree to rescind the article; for it is a principle of universal jurisprudence, that a compact cannot be rescinded by one party only if the other party does not consent to rescind it, and does no act to destroy it."

Now we submit that, British and foreign authors have the strongest claim upon the justice and liberality of nations to afford them all reasonable protection against the piracy of their copyright *during war* as well as peace. It would be difficult to exaggerate the importance of works of literature, music, and the fine arts, whether for purposes of instruction or amusement, and their vast influence in promoting the moral and material happiness of mankind. Besides their utility for purposes of instruction and amusement, the profitable employment created by the reproduction of such works,—and consequently their importance in the interests of commerce—is far greater than can be imagined by those who have not investigated the subject.

The omission to which we have called attention may of course easily be remedied by an additional article, by way of amendment, to the conventions in question. It would, by analogy, be in harmony with the somewhat recent Treaty of Paris as to privateering, and the generally advanced spirit of humanity and benevolence in Europe, which seeks to confine the misfortunes of war within the narrowest limits essential for international purposes; and especially to prevent those misfortunes pressing with unnecessary severity upon *individuals* of belligerent nations. Every civilized State throughout the world has now its laws of copyright, which is *personal property* as much as a bill of exchange, and ought, therefore, to be at least as much protected from theft. Is any nation entitled to respect for the justice of its laws which permits its subjects to steal the copyrights from foreign authors, because their works were first published in a foreign state? England, France, and the twelve other European nations with which Her Majesty has entered into copyright conventions, have thereby solved that question in favour of authors during a time of *peace*. Surely, the provisions of those treaties ought equally to provide against a state of *war*. In the present aspect of affairs upon the Continent, it seems important, if the omission in question is to be remedied, that it should be done with as little delay as possible; and now that Parliament has met, every opportunity is afforded of calling attention to the subject. For the reasons we have assigned, we therefore submit that the consolidation and amendment of our legislation upon copyright *is* a matter "of urgent necessity."—*Athenæum.*

Proceedings of Societies.

The American Photographical Society.*

fifty-fourth meeting.

The annual meeting of the society was held in the University Chapel, on Monday evening, the 8th inst., Professor John W. Draper presiding.

The following gentlemen were elected as officers:—President, Professor John W. Draper; Vice-Presidents, L. M. Rutherford, Professor Chas. A. Joy, Abram Bogardus; Corresponding Secretary, Nicholas Pike; Recording Secretary, Oscar G. Mason; Treasurer, Henry L. Boltwood.

Original Communications.

Professor Seely read papers as follows:—"The Early Methods of Lighting," by John Johnson; "The Benzoin Process," by H. J. Newton; and "A New Silvering Process," by himself.

Mr. Duchochois said that he was much pleased with the specimens exhibited by Mr. Newton; he had not seen the paper negatives excelled in delicacy and finish. They were particularly admirable for the absence of granulations and mottlings of the paper. He had had an experience of ten years in the wax and other paper processes, and he was prepared to believe that Mr. Newton's process was superior to any of them.

Mr. Crum to Mr. Newton.—Have you tried the keeping qualities of your paper.

Mr. Newton.—I have not. I have used the paper within a day of its preparation.

Mr. Crum was glad Professor Seely had brought forward the subject of heating the silver bath; he happened that morning to make a little experiment, the result of which went to substantiate what that gentleman had said. He had filtered his silver solution for silvering his paper, and discovered that it was quite cold, and it occurred to him to set his porcelain dish on the top of the stove, and it became heated so much that he was a little fearful as to its effect on the silver, not knowing that it could be done. However, he thought he would try the experiment, and silvered two or three sheets while the solution was quite hot, and was glad to observe the contrast between the paper he thus silvered, and that which was silvered with a cold solution; there was a marked difference in brilliancy of tone in favour of the heating process. It was a matter entirely unpremeditated on his part—a merely accidental experiment.

Mr. Duchochois spoke of a new developer which he had devised (see p. 227). He did not claim it as entirely new. Sittings did not require to be near so long as by the ordinary process. He found, too, that the developer gave intensity. He had not had time to experiment very much with it; he believed it could be improved; at any rate he believed it to be much better than the old process.

Mr. Crum said that so far as the developer spoken of was concerned, he believed it to be, judging from his experience, a great desideratum to photographers. It was the first day he had tried it, and he had with him some cartes de visite taken that day; they were nothing remarkable; but he had two of children that were taken almost instantaneously. His gallery had a very large light; sitting in it was almost like sitting outdoors. He exhibited the pictures, and said he was very

* Condensed from *Seeley's American Journal.*

agreeably disappointed at the success of the process. The usual time for children to sit in his gallery was from two to four seconds, but these were taken in half the time, if it required even so much as that. Almost the moment he removed the cloth, one of the children moved, and he instantly restored the cloth; he was very agreeably disappointed on examination to find a good negative. He did not make the developer so strong as the formula laid down by Mr. Duchochois; he thought there was great danger of the solution being too strong. He would suggest that he thought it might be modified not only by the addition of more water, but by the addition of more acetic acid.

After some votes of thanks the proceedings terminated.

Correspondence.

THE SUPERIORITY OF CHLORIDE OF GOLD CONTAINING "PROTOCHLORIDE" FOR TONING PURPOSES.

Dear Sir,—Much notice being at the present time directed to the preparation of the salts of gold, I am induced to call your attention to the "apparent" advantages the chloride offers for toning, when so prepared that a small portion of "protochloride" is also formed.

Having been led by observation to form this opinion, I have for some time past prepared the chloride so that a very small portion of the protochloride, in excess of what the concentrated liquor retains in solution, should be produced, and have found a very decided preference given to it.

I am disposed to think that the good effect is not simply due to the absence of excess of acid, for an ordinary sample neutralised with soda does not appear to show it, but that the terchloride is in some slight degree modified or retains a minute quantity of the protochloride in solution; for, though the latter is insoluble, according to the general acceptation of the term, it is doubtful to my mind whether entirely so in combination with the chloride; an appreciable quantity certainly appears to be retained by a concentrated solution of terchloride when formed in it during preparation, as evidenced by a slight cloudiness in the previously clear liquor upon diluting with distilled water. I am also inclined to the opinion that the favour shown the neutral or sodio-chloride of gold, when carefully prepared, is due to the tendency to the formation of this salt in its preparation.

Mr. Francis Sutton's letter, in your last, and your remarks upon it, brought the subject to my mind, and I shall be glad to know whether your own experience, or that of any of your correspondents, coincide with mine. Perhaps Mr. Sutton, who has devoted much attention to the salts of gold, will favour us with his views.—Faithfully yours,

Alfred Keene.

P.S.—I quite fall in with your opinion that the insoluble portion referred to by Mr. Sutton was protochloride of gold, as first supposed by him.

115, *Warwick Street, Leamington.*

[The perfect neutrality which is ensured in the samples of terchloride of gold in which a trace of the salt has been reduced to a protochloride is an unquestionable advantage. Whether any advantage can accrue from the presence of a salt which is insoluble appears at present questionable. We shall be glad, however, to hear further opinions on the subject. Where an insoluble residue is found in samples of chloride of gold, photographers should remember that this need not be wasted. The addition of a little hydrochloric acid to the residue will render it soluble, and after neutralizing it becomes, of course, of proper toning value.—Ed.]

RUINOUS COMPETITION AND FOOLISH CHEAPNESS.

Sir,—It is much to be regretted that your articles on two-penny piracies should not be brought forward in the daily journals, that the public may be warned against cheap and inferior photography; though it is certain that the present grievances of the profession have been brought upon its members by themselves—of course, with many exceptions. A few years since, when the carte de visite became so general, the members of a firm in Regent Street, who had enjoyed a considerable reputation for large coloured portraits, perceiving the tide was changing, and thinking to grasp the whole of the trade into their own hands, daily advertised that they had been pressed by their extensive connexions to undertake card-portraits, which they intended to do, and to give 20 copies for a guinea. The number then usually given was 8 at the same price. Soon after, a foreign house on the opposite side, not to be outdone, offered 25 for a guinea. Then a large company came west, and started with capital (and trade experience) unlimited, and attempted to mow down the whole of the photographers by giving 10 copies for 10s., and so treat art as they would cast-iron nails. Another person, who had successfully studied the cheap dodge, opened several branch houses in London and the provinces. His price is 2s. 6d. the first copy, or 6 for 5s., and so on. Swarms of other men, who have been brought up behind grocers' and drapers' counters, go out as operators, as soon as they have learned the mechanical part of the business, borrow £50 or £100 from their *uncle*, and start in business for themselves, writing over their door, "*From* Claudet or Mayall." Now, what knowledge of, or feeling for, art have these men? And the public, misled by their advertisements of cheapness, leave respectable photographers, and run after those who give the most for their money. They pay down a few shillings, are walked upstairs, placed against a head-rest which is never moved, and the light never changed; they are told to "fix their eyes on the object, and call up a animated ex-expression;" a single shot does the business, for they are informed the portrait is most successful. When the deluded victims get their portraits, and complain, they are politely invited to another crown's worth. But this pays as well as a quack medicine. It is said, if you spend two thousand a year in advertisements, you are sure to gull the public, and clear one for yourself.

The photographer who studies his profession, and has a real love for the art, gives much time to experiments to improve his process in every possible way. With his sitters he takes considerable trouble to produce a really good and artistic likeness—studies the face to discover the best outline—watches the movements and peculiarities—keeps up conversation to remove the stiff and distant manner, and bring forward the usual expression, as when with familiar friends. The first plate is seldom of use—it only serves to break the ice—for as soon as it is taken, the sitters seem to throw off a weight of alarm and nervousness, and recover their natural state. It is only the second or third plate that can be expected to be an agreeable likeness. All this talking and anxiety is dreadful wear and tear to physical and mental powers, particularly during the summer months, at a temperature of 75° to 100°. He must be early and late in his business to watch that the printing and toning is carefully done, that his chemicals are in order, his operators (who claim handsome remuneration) are attentive to their part of the business, and that the whole routine is well and expeditiously carried out. If he pursue his profession thus conscientiously, how is it possible that he can compete with many of the race who call themselves art-photographers? The public encourages them, instead of paying a fair remunerating price for the skill, labour, and time bestowed on good work, he is *driven* either into the cheap system or leaves the profession in disgust. In Paris, about two years since, all the respectable photographers agreed amongst themselves to a fair scale of charges, why should not such a system be carried out in this country.—I am, sir, your obedient servant, B. P.

Dear Sir,—Allow me to give my entire assent to the remarks of yourself and correspondents in last week's News with respect to the foolish practice, becoming so general amongst photographers, of under-selling and taking "cheap" portraits. It is a system to be utterly condemned, fatal as it is to the best interests and prospects of our art-science, for who, in the competitive race, can care for artistic qualities, or even, at length, for excellence, chemical, or manipulative, when the whole desire is absorbed in the determination to turn out so many pictures for so much, and, in this respect, equal the concern over the way? It is suprising to me that there is not a more chivalrous spirit amongst the brethren of our craft. If I am to compete with a rival, let us stand on even ground, evenly armed, and then there will be some glory in a victory, and honour in

the fray. But to success, by vending inferior pictures in worthless abundance, for a miserable sum, to a public too apt to overlook radical defects, if the things bear but moderate resemblances of the prototypes, seems to me unworthy the name and profession of artists.

I fear that much of the evil has arisen from the unhappy grafting of photographic knowledge and pursuits on the huckster's stem. Whence else come the touting and itinerant systems? Coleridge, writing to Davy, spoke of "a poor sutor,* who had ultra-crepidated with more zeal than wisdom." It is unfortunate that photography should be the refuge of so many of these "ultra-crepidants," who there display, to our sorrow, their characteristic compound of folly and zeal.

If there be one direction in which, more than another, the call is for progression, it is the artistic and æsthetic quarter of our art. Yet to advance here is not so easy. Thought, patience, care, and time are required. Yet how can we afford to give these, if we have to fill up our days with hurried sittings, and our nights with processes, in order to compete with "Dick," the metamorphosed saddler, who is vending his *cartes* for 7s. 6d. the dozen ("3s. 6d. the brown sort"—*sic*), in which a flashy background hides bad operating, and a *mêlée* of accessories has to apologize for want of taste and skill.

The ordinary axioms of commerce—such as, "Competition benefits the public," "As is demand, so is supply," and the like—must be relaxed in their applicaton to photographic results. We must not count by numbers, nor decide by size. The weight of gold that Benvenuto Cellini wrought into casket or vase was scarcely reckoned in the enhanced value due to the labours of his brain and hand. So with photography. Whilst one man will fashion from his chemicals and apparatus a picture worth a hundred times the cost of production, another's best effort produces scarcely a tithe. It is an insult to the first to be asked to sell his goods at the price of the latter.

In the midst of the unpleasant rivalry so prevalent, it is pleasant to perceive that the public are becoming better judges of what should constitute a good picture than formerly; and although one cannot venture to predict that the days of cheap and villanous portraits are numbered, there is the prospect that, ere long, the ignorant of the worst classes will be the only patrons of the said abominations.—I am, dear sir, faithfully yours,

R. H. P.

Sir,—Pardon me troubling you, but on reading the able letter of "Fair Play and No Favour," I could not resist the temptation of having something to say, as our establishment is now, as it were, a "party concerned," and especially as your correspondent acknowledges his writing from the "fair town of Brighton," a town where the *highest prices* in photography should *be kept up;* a town where photography is carried on *most successfully;* a town situated in a part of England conducive to carrying on the requirements of the art, possessing light, temperature, &c., no doubt as good as in any other place in England: and, moreover, a town where "gentlefolks" come expressly to enjoy themselves and spend their money. But to "what base uses" is our beautiful art subjected, by unscrupulous men, who possess large scheming faculties, and little respectability, and frequently boast that "*fortygraphy's* a *fust-rate* game."

I manage a small but respectable business, established many years; the late proprietor was the first photographer in the South of England. Our prices have been for some considerable time, 10 for 10s. (nothing less) or 24 for £1 1s. 0d., which I consider a fair tariff, and we have a position for business not to be *excelled* in this the fair town of Brighton.

But, on the very day on which the Photographic News was published, containing "Fair Play and No Favour's" letter, two flaming placards were exposed to the eye of the public, for the first time, announcing the first "carte de visite" for 1s., and why? we were compelled to do it. Employers cannot afford to keep assistants walking about with their hands in their pockets, when the cheap fraternity had plenty to do. I send you the first shilling picture I took; we turn out very few worse than that; do you not think it worthy of a higher price?

Pardon me if the space I desire to claim on this important subject is too great. In conclusion, I think it is a pity that photographers do not amalgamate more, especially as theirs is now quite a distinct business, and it is withal a great pity that our beautiful art should be so easily accessible to "bruisers" and "Tipton Slashers" as it is, but so much for the march of intellect and spread of civilizatiou.—I am, sir, yours respectfully,

A Lover of the Art.

Sir,—As you invite correspondence upon the low price system practiced by some would-be monopolists in the profession, I beg to trouble you with this my first letter, with reference to the twopenny pirates, they are, of course, a great nuisance, though not likely to do much damage in the end, as the public are fast becoming good judges of photographs. I have known several of my customers send their half-crown to get a dozen or fifteen copies, and did not receive them until it had cost them several pence more for threatening letters; but I never heard that any were satisfied with the trash they obtained, as they said in every case that they either had or must destroy them, and have come to me for more from the negative, and so became losers of about 3s. by the pirates and 1s. by me, as I charge 2s. 6d. for a single carte. But I believe the greatest enemies respectable photographers have are amongst themselves, as it generally happens that in all large towns there is to be found one or more who seem to think they are entitled to all the work; they, therefore, resort to the un-business-like system of low prices. It is more than three years since I commenced taking carte portraits. As I was the first to take them in this neighbourhood I had to go to London to learn what price to charge, and I decided to charge the same as the London Stereoscopic Company, and all my customers were satisfied; but a few months after, while taking a gentleman's portrait, he informed me that I should have to lower my price, as *my neighbour* would take a single carte for 1s., and the after copies at a still lower price. I soon after thought myself compelled to make a slight deviation from my former terms. A few days back, a gentleman required a carte group of four gentlemen that I have published, and tendered 6d., in payment, and was surprised that I charged 1s., as he said Mr. —— only charged 6d. for similar pictures, and that he had had half-a-dozen of his own taken for 4s. 6d. Now, sir, in my opinion, this style of doing business is very like committing suicide, or, at the best, a great mistake, for if we are only satisfied with a moderate practice, and to do as much as our neighbours, the price can easily be kept at a fair standard, although twopenny pirates do exists. Again, there is a class of persons, here and elsewhere, calling themselves photographic artists that are not worth notice; I mean those unfortunates that are without capital either intellectual or otherwise, who just manage with a common lens, and chair, and one ounce of collodion, &c., to take a very common likeness, and, of course, obtain only a low price; but where a man lays out a large capital in purchasing things that in all probability will not fetch him 10 per cent. of what they cost, and as improved ones are constantly coming out, if not for his own sake, certainly for the art he professes to respect, it is his duty to do all he can to prevent the price falling below what is fair and respectable. Now, I see no way of preventing photography being degraded by low prices except by combination. Could not a society be formed in London, calling itself the British Photographic Protection Society, or some such name, and admit only those who would pay their share of the working of the society, and agree to a certain fixed price for the various sizes of photographs, taken either by themselves or their assistants, for I believe it frequently happens that some are tempted to get too many about them in busy times, such as apprentices, &c., and then in slack seasons to get employment for them, they resort to the cutting system. If, through the instrumentality of your valuable journal, such a society could be formed, it would become a great boon to all who wish to carry on the profession in a respectable manner. And I hope that some who have erred and fallen into the mire of cheapness have sufficient respect for themselves and for photography, to take courage, acknowledge their blindness, and retrace their steps. I shall anxiously look for the Photographic News to bring me tidings that abler minds than mine are taking steps to suppress this growing evil, for if it is suffered to go on without an attempt to remedy it, all our best men will be disgusted, the art will cease to progress, and be left to the mercy of door-men and low-priced ticketing establishments.

A Man of Kent.

Sir,—In reading your journal of the 4th inst., I was glad to find some one of the same opinion as myself respecting the reckless competition in portraiture, "A Professor who keeps up his

* *Ne sutor ultra crepidam.*

Prices" proposes to do away with the system by combination, and I believe that is the only way that a remunerative price can be continued, for in all quarters you can see one man cutting under the other. There is in every place, I believe, one or two that would never agree to such an arrangement, but they are cheap and nasty, to them I do not allude. It is to the respectable class of the profession, who really desire according to what I frequently see of their work, a better price than they get, and which does not sufficiently pay them, but they can't unfortunately see the mistake they are making. Therefore, I say, let us at once try and do something to stop this growing evil. I should propose that some influential member of the different photographic societies bring the subject forward at their next meetings, by so doing the feeling of the members present will be at once known, and perhaps a plan set on foot there and then. LIVE AND LET LIVE.

Kingsland.

Photographic Notes and Queries.

MR. REJLANDER'S GLASS HOUSE.

DEAR SIR,—I have noticed in your reply to correspondence, of the last PHOTOGRAPHIC NEWS, something that concerns myself. I am truly obliged to you for so considerately taking my part, and stating just the fact. Still, I beg to apologise to several gentlemen, who have written to me on a similar subject, for not replying to their queries. It seems rude, but I have a great aversion to letter-writing, particularly to writing the same thing over and over again, that I have done; and when I say that I am a bad correspondent, even in cases that concern my own interests, I hope to be forgiven.—I am, dear sir, yours very truly, O. G. REJLANDER.

CONTINUED USE OF THE SAME TONING BATH.

DEAR SIR,—Rather more than a twelvemonth since, I had the pleasure to address you on the method I use in toning, which you did me the honour of publishing in No. 234 of the PHOTOGRAPHIC NEWS, vol. vii. p. 106. Since that time, I have used, and still continue to use, the bath I then had; and as a test of it, have, in that time, toned about 2,300 prints, principally cartes, not having had a single instance of mealiness, my consumption of gold having been two 15-grain capsules. The only alteration I have made in my practice is the substitution of thin *Saxe* for *Rive* paper. Are you aware if any of your readers or correspondents have tried this method, and if so, has their experience been in accordance with my own? I enclose a print from my last batch, done about a month ago, in a keen frost, to enable you to judge of the action and tone.—I am, yours obediently, F. LANE.

Rotherham, March 7th, 1864.

CHLORIDE OF MAGNESIA AND GOLD BATH.

SIR,—The bath which toned the cartes I sent you was composed as follows:—

Borax	3 drachms
Gold	3 grains
Chloride of magnesia sat. sol. ...	1 drachms
Water (distilled)	80 ounces

and used about seven hours after mixing; but it can be used much sooner. By filtering the bath every evening after toning, and adding a few drops of the chloride of magnesia solution, and a few drops of a solution of gold the next evening, when about to tone, the above bath will keep a considerable time, and give brilliant results. I have used chloride of magnesia with carbonate of lime, and have obtained very nice black tones. One can scarcely tell the difference, if at all, between the above bath and one composed of chloride of lime with carbonate; perhaps it would be safer to use than the ordinary chloride of lime, as that article cannot always be obtained pure.

I do not use regularly either of the above baths; they are merely the results of experiments, yet not to be despised. I am most partial to the lime bath. I will give you my formula; I believe it is the best of all lime-toning formulæ, and not to be beaten for simplicity of working and brilliancy of tone. A trial of the following will no doubt endorse my opinion:—

Borax	3 drachms
Gold	3 grains
Chloride of lime, sat. sol. ...	2 or 3 drops
Distilled water	4 pints

Now this can be used with certainty immediately after mixing, There is no waiting days or weeks.

The tones are not thoroughly black at first, but by adding a few drops of the chloride of lime solution every evening* after toning, and gold according to judgment, the bath will keep a long while, and the tones will get deeper and deeper I have used one for months. I send you a print or two. My nitrate bath is generally 40 grains with one ounce of alcohol to eight of water:—but the enclosed cartes are the results with nitrate of soda, as follows;—

Nitrate of soda	60 grains
Nitrate of silver	20 ,,
Water	1 ounce

—I am, sir, yours respectfully, D. DUNCAN.

Brighton, March 2nd.

CHEAP OXYGEN GAS.

SIR,—In the *Manchester Examiner and Times* newspaper of last Friday, the enclosed paragraph appeared:—

"NOVEL MODE OF PRODUCING OXYGEN GAS.—At a lecture delivered to the shampooers and attendants at the Hammàm, Jermyn Street, on Monday night, by Dr. Leared, physician to the Consumptive Hospital, a novel mode of producing oxygen gas in a perfectly safe, cheap, and simple manner was introduced for the first time in public by Mr. Robins, the analytical chemist. The method consists in treating chromate of potash and peroxide of barium with diluted sulphuric acid. The operation is performed in a common glass jar or retort, and at the ordinary temperature. To those who are acquainted with the plan hitherto adopted of heating manganese in iron bottles, this discovery will need little recommendation, and it is difficult to predict to what discoveries and improvements in the economy of life and light it may lead. Meantime, it is interesting that this discovery should have been first introduced to the public within the walls of an institution where the body is so largely benefited by natural processes of oxygenation. The lectures delivered by Dr. Leared at the Hammàm are for the instruction of the persons employed there, and are designed to impart to them the rudimentary principles of those parts of science which relate to the laws of life and the construction of the human body. That delivered on Monday night was confined to the operation of the three gases, oxygen, carbon, and hydrogen, upon the animal economy."

The cost of producing oxygen gas from chlorate of potash and manganese is near or about 3¼d. per foot. Mr. Robins' method would be a decided improvement, even at the same cost, on account of being able to make the gas without the use of retort and heat.

Then again, at a cheap rate, this might be used for photographic purposes, viz., printing by development, and a variety of other useful purposes in connection with our fascinating art. As an amateur, I devote all my leisure hours to photography, and use also a considerable quantity of oxygen gas, in making various interesting experiments; but at the same time, not sufficiently acquainted with chemistry to understand this question thoroughly, perhaps you can kindly furnish me with the *proportions*, and cost of making oxygen gas, by the process named. If so, I shall deem this an especial favour. Your reply in the NEWS will oblige, Sir, yours very respectfully,

Colne, March 5, 1864. THOMAS RATCLIFFE.

[Mr. Robins, we believe, sells the materials ready for use, but has not published details. See p. 16 of our present vol. —ED.]

Talk in the Studio.

SOLAR CAMERA ARRANGEMENT.—We have received a further communication from Mr. Aldis, enforcing his claim to the contrivance for working the solar camera conveniently in winter. As, however, the matter is one rather of personal than public interest, and each claimant has had an opportunity of stating his case, the matter must rest there.

THORWALDSEN'S BAS RELIEFS.—Messrs. Marion and Co. are about to issue a very magnificent series of photographs, from the original *bas reliefs* of Thorwaldsen. They are amongst the most perfect examples of photography we have ever seen, and

* It should also be filtered.

this application of photography is at once one of the most successful and legitimate of its art applications.

Artistic Copyright.—On the 3rd ult., Mr. Black obtained leave to introduce a Bill for the consideration of the Acts relating to copyright in works of literature and the fine arts, and the Bill was brought in and read a first time.

The Forthcoming Photographic Exhibition.—We hope to publish in our next the detailed conditions for the guidance of exhibitors at the next Photographic Exhibition. In the meantime we may state that the Exhibition is intended for works of members of the society. Non-members may exhibit by becoming temporary members for the occasion, by the payment of a year's subscription, without entrance fee. No coloured or touched work of any kind will be admitted. Five silver medals will be distributed for excellence in different departments.

Mr. Swan's Carbon Prints.—The extreme delicacy of the gradations in these prints has caused a doubt in the minds of many of the persons to whom we have shown them, as to whether the image really were formed of carbon. Mr. Shadbolt suggested that the microscope would set the matter at rest. As that gentleman is an expert microscopist, we placed a print in his hands for examination, and have just received his assurance that, after a microscopic examination, he had no doubt whatever that the pictures were genuine carbon prints.

To Correspondents.

Parvus, No. 48.—Send us a stamped and addressed envelope, and we will forward you the address you require, as the gentleman is not desirous that it should be published.

A Young Subscriber.—For general purposes we prefer that which you mark B in your list. For a camera, C will, probably, answer your purpose best. Your view of the church would have been better had you used a smaller stop. This would, of course, have increased the exposure, but this is not a matter of importance in taking a building.

A Bothered Photographer.—Persons strongly marked with freckles present some difficulties to the photographer; but, by the exercise of skill and experience, these difficulties may be partially overcome. Use a collodion containing a full proportion of a bromide, and give plenty of exposure. Sometimes it is necessary to use a little powder carefully applied to the face. 2. In testing prints for the presence of hyposulphite, use the subnitrate of mercury, prepared by dissolving mercury *in excess* of cold nitric acid.

J. M. B.—A print of every different position must be registered; otherwise the pirate may copy that which is not registered. It will not be necessary to register the painted copy, if the uncoloured print be registered.

Mace W. B.—If you develop your transparencies with pyrogallic acid with acetic acid, the tone will be browner than with the ordinary iron solution. If you use the saccharo-sulphate of iron, with double its weight of acetic acid, giving a long exposure and rapid development, you will obtain a rich purple brown tone. Perhaps the best rich brown tone is obtained by using tannin plates and developing with pyro and acetic acid. The exposure will vary so much with the class of negative, the kind of light and condition of the chemicals, that it is quite impossible to state it accurately; but one or two experiments will always decide. There is no work on transparencies.

A Tonka.—The toning bath, with acetate of soda, gives the richest purple tones; but much depends on the quality of the paper and the character of the negative as to the exact tone obtained. With a brilliant negative, and the acetate bath, the tone you describe is easily obtained.

The Silver Sunbeam.—A correspondent, who signs no name, asks where the work lately reviewed in our pages may be obtained in London. Mr. Atkinson, of Liverpool, is the English publisher. Most London dealers will be able to procure it.

J. P. Stewaaton.—Your light is too directly a front top light, and the faces of your figures are, therefore, very flat. There are too many straight lines and right angles in your arrangement of accessories. The printing is clean and good. The tone of No. 2 best. No. 3 is inky. But, altogether, your progress is creditable. Strive after more softness and modelling, with less contrast. 2. On adding citric acid and carbonate of soda to your silver bath, a copious precipitate of citrate of silver would be thrown down, which would weaken your bath, and hence it dissolved the albumen. The bath will require strengthening.

A. Robertson.—We shall shortly give attention to the subject you mention.

Iron.—The defect of which you speak most probably arises from the use of a tough impervious collodion. We have, with some samples of collodion, noticed a great tendency in the silver solution to run in greasy-looking lines on the surface. Sometimes the addition of one or two drops of distilled water to each ounce of collodion will effect a cure. If that fail, try another collodion.

A Pauper.—We can only recommend you to write to some of the large publishers, and make the inquiry.

Camera.—Mr. Wilson uses a variety of lenses for his stereoscopic work: chiefly single. We believe, French, Ross, and Dallmeyer. We believe he has been using lately chiefly a special form of single lens made for him by the last-mentioned maker. With which "The Brig o' Balgowrie," or "Holyrood Chapel," was produced, we do not know.

J. B.—We believe that the surveyor can interfere at any time when he may discover that the law has been infringed. But probably he would have to prove that it was done since the passing of the Act, which might be difficult for him to do.

Enlarged *v.* Direct Negatives.—A correspondent says:—"If 'Amateur' will call at Messrs. Lampray and Co., 44, Paternoster Row, he will there see what may be done by enlarging from quarter-plate negatives, the result wholly depending upon the sharpness and beauty of the small negative.—I am, sir, yours respectfully, The Man Parsent."

M. Salt.—It is difficult to state with certainty the cause of the stain. We should be disposed to regard it as the result of an imperfectly-cleaned plate. The less alcohol you use the better. 2. The spot arises from a defect in the paper.

A Constant Reader.—We have seen results like your purple print produced when white light has been suffered to fall upon the toning bath, and prints in it. The other unsatisfactory tone we should have felt disposed to attribute to the use of a poor negative; but we cannot speak with certainty.

Doubtful.—It is not absolutely necessary that the silver bath for tannin plates should contain acetic acid. It may be used neutral, or even with nitric acid, but there is less certainty of satisfactory results. The chief evil to be apprehended would be thinness and fog.

T.—We have no data upon which to form a satisfactory estimate of the number of photographic establishments in the United Kingdom. 2. A mixture of the three solutions you name would simply produce a mechanical mixture of the three.

C. T. B.—By the addition of a bromo-iodizing solution, or if already iodized, of about half a grain of bromide of ammonium to each ounce, the collodion may be made suitable for iron development. 2. The splitting of the film in drying, and the varnish causing the film to blister, are very suggestive of imperfectly-cleaned plates, which are more injurious with some collodions than others. 3. If your toning bath will do its work you need not hesitate to use it.

J. S.—We are not familiar with such a lens as you describe. We shall be glad to see some of your results.

Humble Reader.—A strong bath generally gives a more sensitive plate than a weak one, and also more vigour. 2. A negative bath looking discoloured is a bad sign, but it does not necessarily follow that it will not work so. We should unhesitatingly abandon the collodion which caused such discolouration. From your description of it, it is probably old and decomposed. Such a collodion often gives irridescent colours, with shadows of a glass positive when dry. The *Rive* paper is somewhat apt to blister on removing from the hypo. We do not know any effectual remedy when the tendency is present. 3. Pyroxyline may be made at temperatures varying from 120° to 150°, or higher, depending upon the use for which it is intended; from 120° to 130° for positive collodion, and from 140° to 150° for negative. 4. You will find details of the camera, &c., in an article on card portraits, in our last Year-Book.

S. C. A.—M. Niepce de St. Victor has produced photographs, which we have seen, in which he has secured many of the colours of nature, but those colours are not permanent in the light. 2. The details have appeared in our pages. 3. We have found several varnishes good for negatives, but cannot say which is best. Ponting's Bristol hard varnish, Sutton's negative varnish, Smith's (of Plymouth) negative varnish, have all proved satisfactory in our hands.

E. H.—A good deal depends on circumstances. You will find our opinions at length on the subject in our last Year-Book. Perhaps Mattheson's, with the modifications we suggest, is as good as any.

R. H. D.—We have not seen the groups in question, and do not know when lens is employed. We may possibly be able to ascertain, and let you know.

A. Reeves.—The microphotograph received, and shall have due attention.

G. A., Hitchin.—The only peculiarity in the appearance of the print we notice, is a somewhat cracked effect in the albumen surface, which might possibly arise from several causes.

L. B. B. S.—We are not aware of any agent for M. Liebert's solar camera in this country.

H. Senior.—The photographs for registration, referred to in your letter, have not arrived.

Several Correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already acknowledged	347	3	2
J. Bashford, Esq., Jersey	0	6	0
A Youth	0	1	0
Edward Kater, Esq., F.R.S.	1	1	0
Cornelius Hanbury, Esq., Jun., London	0	10	6
W. W., Edinburgh	0	5	0
Henry Berlon, Esq., Bradford	1	1	0
G. Houghton, Esq., London	1	1	0
	£351	8	8

Photographs Registered during the Past Week.

Jesse Harris, 83, Queen Street, Portsea,
Two Photographs (Copies) Group of Naval Officers—Medallion Heads.

Mr. Thomas Leigh, Wellingborough,
Photograph of a Lamb, yearned February, 1864, with Two Bodies, Eight Legs, and One Head.

A. Werner, 15, Leinster Street, Dublin,
Two Photographs of General Sir George Brown.

Messrs. Forster and Haskoll, 30, Westmoreland Street, Dublin,
Photograph of the late John Moore Neligan, M.D.

Mr. Henry Vines, Clifton, Bristol,
Photograph—Bristol Chess Congress, 1861: representing Paulsen and Kolisch at the Chessboard, and others looking on.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 289.—*March* 18, 1864.

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THE FORTHCOMING PHOTOGRAPHIC EXHIBITION.

In another column we publish the arrangements and condition upon which the Council of the Photographic Society have decided as regulations for the forthcoming Photographic Exhibition, to be held in the Gallery of Female Artists, in Pall Mall. In many respects we can congratulate photographers on the arrangements made, as affording promise or facilities for a better exhibition than the society has had for many years. The season of the year is more auspicious than before—the gloomy winter weather, and the absence from town of a large portion of society, have had hitherto a very injurious influence on the attendance. The room is in a more accessible and desirable position, and although so small as to compel the refusal of indiscriminate contributions, we hope that the process of selection or filtration will have a beneficial influence on the quality of the exhibition, and ensure a display of nothing that is not creditable to the present position of the art.

Some of the conditions are, moreover, we think, most important and praiseworthy. The rigid exclusion of all touched pictures is an unquestionable step in the right direction, as securing an exhibition of the progress of photography proper, and of that only; also giving a heavy blow and great discouragement to a practice poor at best, and which, from the advanced state of the art, now admits of no excuse whatever. The exclusion of all coloured work is a more questionable piece of policy, as the use of the photograph as the basis of a coloured portrait, whether for life-size or miniature, is one of the undoubtedly proper *applications* of photography, and colour moreover contributes much to the interest of an exhibition. As the matter now stands, such productions are equally excluded from exhibitions of paintings or of photographs, and must, we presume, be relegated to Milton's limbo of vanities. There is, in the present instance, the plea of limited space; but, whether it will justify the ruthless and entire exclusion of coloured photographic miniatures, is a question open to consideration.

There is another condition which may be considered to press rather hardly, we think, on some exhibitors. We refer to that which renders it necessary to send a duplicate unmounted copy of every picture intended for exhibition. This may in some instances amount to a serious tax, the more so, that such copies are not likely to reach the hands of their owners again at all in a presentable condition. Take as an illustration, one of the pictures which appeared in last year's exhibition—Mr. Robinson's "Bringing Home the May." This was catalogued at a price of twenty guineas, a sum somewhat unreasonable to be sacrificed in the contribution of a duplicate copy. It may be alleged that the condition which forbids retouching would exclude such pictures from the exhibition. To this statement we demur entirely, as we have seen many such pictures, which were so entirely free from retouching as to bear sponging with perfect impunity. The condition which forbids any inscription upon a picture or its mount, but the name of the sender, is, we think, also an error, the name or title of the subject being most desirable, lending much interest to the exhibition, and saving much troublesome and unnecessary reference to catalogues.

In referring to the announcements in reference to the award of medals, we have to speak with much more qualified satisfaction. Five medals are announced for the following subjects:—

1. The best portrait or portraits.
2. The best landscape or landscapes.
3. The best group or groups, or composition or compositions, each from a single negative.
4. The best architectural subject or subjects.
5. The best printed impression from a photograph transferred to metal, stone, or other material, and absolutely untouched.

It will be seen from this list that reproductions and combination pictures are excluded from competition for honours. The group, or composition, must be from one negative. Reproductions are not mentioned at all. It is somewhat singular that two branches of photography, which most distinctly ally it with the fine arts, which demand the most perfect art-education, and which admit of the most interesting and valuable pictorial results, are thus excluded from the chance of medals. There was a time, we remember, when a member of the society exclaimed in a discussion "What do we, as photographers, want with pictures?" But we thought that such times were gone by. It may be, it is true, and we think it is very likely, that the council regard Art as its own exceeding great reward, and believe that the photographer who succeeds in producing perfect art results will not need the encouragement of medals to induce him to persevere. Nevertheless, we demur to this facetious mode of dealing with the matter. Reproduction includes not merely copies of paintings, but copies of bas-reliefs, groups of still life, &c. We have heard it argued that copying is simply a mechanical operation. Is it? We venture to affirm, however, that there are not more than half a dozen photographers in the United Kingdom who will produce copies of equal excellence with Mr. Thurston Thompson's reproductions of the Turner pictures. To copy even an engraving well implies sufficient art-knowledge to know what is a good copy—a knowledge by no means so common as many might fancy. To produce a good copy of a painting demands not only perfect mastery over photographic conditions, but a distinct appreciation of the perfect translation of colour into chiaroscuro. To produce a satisfactory group

of still life demands an amount of photographic experience little dreamed of by those who have never made the attempt. If the successful achievement of such an attempt be not good photographic art, then such a group painted by Lance is not good art in painting.

As if to give point to the slight offered to reproduction, a medal is offered for an architectural photograph! Now, without depreciating the beauty of some architectural photographs, or the value of such an application of photography, we do affirm unhesitatingly that it is by far the most mechanical branch of the art, and one making less demands upon the artist's knowledge or the photographer's skill than either portraiture, landscape, or reproduction. It might, indeed, be placed as an easy or low department of reproduction. The judgment to select the point of view and time of day in relation to lighting is necessary, it is true; that done, the most ordinary manipulatory skill must ensure success. There is no possibility of altering the relation of the parts so as to affect composition, there are neither features nor foliage to move, there is no expression to secure; no difficult combination of colours to harmonize. For all this, and notwithstanding that there is an architectural photographic society to take care of this branch, and if there were not it would take care of itself, we should still have not begrudged it a medal if other more important objects had not been neglected for its sake.

As regards the exclusion of combination pictures, we have not space to enter as fully into the subject here as its importance demands. We know that strong opinions on each side of the subject exist. We think, however, it may be resolved into a very narrow question. By offering a medal for a composition from one negative the council at once admit the propriety of attempting composition by photography. It is, however, a fact which we need not stay to argue, that the scope of photography in this direction is extremely limited, simply owing to the imperfection of optical instruments. They include, with the necessary perfection of definition, a very limited angle laterally; they define over a still more limited space as regards the planes of distance. To meet this difficulty the combination photographer takes his composition in several negatives, and combines the result in one picture. If the result be wanting in harmony, he has failed, and there is an end of the matter. But if he succeeds in producing a perfectly harmonious result, is not his success greater, higher, and more praiseworthy than if he had contented himself with the limited resources which the ordinary appliances and processes of the art present? The Spartan youth, who complained that his sword was too short, was told to add a step to it. The photographer who presumes to follow similar advice, and eke out imperfect instruments, by the use of more thought, skill, and ingenuity, is excluded from the honours awarded to photographing a building.

We cannot better conclude our remarks on this part of the subject, than by the following quotation from a letter, just received from a gentleman whose position in relation to the art to the Photographic Society gives great weight to his opinion. There is yet time for a revision of these conditions, and we hope that the council will not feel it beneath their dignity to regard the advice of those who earnestly wish, and work, for the prosperity of the society. Our correspondent says, "Has photography become so low, that its professors are not to be considered capable of contending for its highest prizes. The council of the society would lead us to suppose so, mediocrity is to be rewarded, and merit must go to the wall. It might encourage the minnows to distribute a few medals amongst them, but it will prevent the Tritons from exhibiting, for they will never work down to the prize-medal pitch, beyond which the council declares the photographer must not further go. Perhaps they proceed on the principle laid down by the Commissioners of the International Exhibition, and reward manufacturers with medals, but decline to offer the same indignity to the fine arts."

SCIENCE IN PHOTOGRAPHY.

Progression by antagonism is, unquestionably, one of the universal moral laws, and one to which the history of photography has furnished no exception. From the commencement three forces, not necessarily antagonistic, but, in this instance, assuming a character of opposition, have been in operation. Art, science, and practice or executive skill, have all claimed the new power as their own, as especially depending on their fostering care for being and progress. The votary of art has looked on photography as the agency which should teach new pictorial truth, embody new beauty, and render in the twinkling of an eye general effects or minute details, which the labour of a lifetime might otherwise imperfectly produce. Science has looked upon photography as pre-eminently its own, as depending, from beginning to end, on a series of delicate chemical experiments, as a rare illustrator of the action of occult chemical or physical forces, and a valuable registrar of some of the hitherto unnoted, or imperfectly recorded, phenomena of Nature. Whilst the "practical man" has smiled at the comparatively worthless results of the "mere artist," or "mere chemist," unskilled in manipulation, or in the nice education of the eye and the delicately appreciative touch of the fingers, which are necessary, in photography, to a satisfactory result. It is, however, to the united operation of the three forces, often stimulated into activity by their slight antagonism, that photography owes its present advanced position.

There has been a commotion recently amongst the experimentalists—those pioneers and sappers and miners in our art—excited by the thoughtless, and, probably, by this time, regretted phrase of a contemporary journalist, in reference to the "absurdities of unscientific photographers." The phrase was at best a dangerous one, and, in this instance, was miserably misapplied; but it may be worth while to inquire a few moments What constitutes science, and what non-science, especially in relation to the sphere of experiment?

Science comprehends, of course, in its widest sense, as its derivation points out, all knowledge. Science is simply knowledge. But it has acquired, by application, a more specific and limited meaning, and is generally understood to mean systematized knowledge—facts verified and arranged, their relations ascertained, their laws deduced, their principles and import understood. The purport of science is, generally, to comprehend and explain the phenomena of the universe. All science has, as Max Müller has well observed, an empirical stage in which facts are gathered and analyzed. The first step in science is the collation of facts: and this is the work of the experimentalist. The next step is the verification of alleged or assumed facts: and this is the work of the experimentalist. The next steps are the analysis, comparison with other facts, and arrangements of the results obtained: and this is the work of the experimentalist. He who has the largest knowledge of analogous and cognate facts, and the acutest perception of their relations, will make the most rapid progress. But it is not by travelling in a groove, or traversing the beaten track, that great discoveries are made. It was not so that Newton discovered the principle of gravitation, that Franklin initiated the discoveries whereby man made electricity his bond servant, or that Talbot and Daguerre commanded the services of Phœbus Apollo as draftsman and copyist. Nevertheless, there are always Tories in science, who oppose all progress which is not in accordance with their theories. Men who have in youth rapidly and earnestly observed certain facts, and from them deduced certain conclusions. By such men new facts, which quadrate with these conclusions, are graciously received; but new facts, which are opposed to them, are denounced with a bitterness almost amounting to personal acrimony.

Photography has illustrated the general history of science in an especial manner. Its earlier years were distinguished largely by empiricism. All the facts were new, and such as

could not have been anticipated by any mode of reasoning *à priori*. By what analogy or "scientific" mode of reasoning, for instance, could the existence of a latent image, capable of being developed into full and appreciable form, have been deduced? With new facts before them, and dim glimpses of new laws as yet unrevealed in regard to the operation of which even analogy was silent, the early explorers had no other resource of reliance but the results of tentative experiment. When a few facts were established, chemistry was enabled to offer a valuable helping hand, and photography has well repaid the loan by bringing to light chemical laws before only dimly dreamed of.

It must be confessed, however, as was perhaps inevitable, that photographic experiment has been characterized by many "unscientific absurdities," which have possessed but little of even empirical value; such as white-washing the interior of the camera, to shorten the exposure; adding a few drops of chloroform to collodion to remove texture or reticulation; the mixture of a heterogeneous conglomeration of "corrosive sublimate, tartaric acid, sal soda, hydrochloric acid," &c., to make a toning bath; the odd use of the whole tribe of sticky messes as preservatives in dry collodion processes, because one or two had been found to possess a limited value; and a legion of similar random crudities. Do we blame the use then of even the most foolish of these? Not entirely. In a field where so much is new, where so much is unknown, where so much is contrary to received law, considerable licence must be permitted in experiment. The wise experimentalist will, of course, bring to bear all his knowledge of the ascertained laws of chemical and physical science, and will be especially careful to observe the suggestions of analogy. But he will not be trammelled by these; he will not be deterred from sinking shafts where the surface gives the faintest hope of valuable ore underneath. The experimentalist who suggested the employment of nitrate of soda in the printing bath, as permitting the use of a much smaller proportion of nitrate of silver, in reference to which the recent discussion has arisen, had a definite idea in making the experiment. He found that a weak solution of nitrate of silver dissolved the albumen from albumenized paper floated on its surface. He believed, nevertheless, that there was nitrate of silver sufficient both to coagulate the surface and to form the sensitive compound, if the immediate solution of the albumen could be prevented. He believed that this might be done by increasing the density of the liquid, as he explains in the letter read at the last meeting of the South London Photographic Society. Whether his theory be right or wrong, the experiment was tried with a definite purpose, and was neither unscientific nor absurd. Mr. Spiller's experiments will scarcely be called unscientific or absurd. Mr. Hart's theory of the operation of nitrate of soda, whether true or not, is based upon one of the most beautiful scientific discoveries of the day, Professor Graham's system of dialysis, and if verified by further experiment, will prove that the contemned process has a sound scientific basis, free from the slightest absurdity.

The moral of these desultory remarks is very plain. We would say to the experimental photographer, first devote your energies to acquire some knowledge of the ascertained laws of chemistry and physics, so as to understand the bearing and influence or recognized phenomena. But by no means stop there; then work boldly in any definite direction to which inclination or opportunity may point to discover new facts and possibilities. *Above all, be sure of your facts.* From a sufficient number of verified facts alone can new principles be deduced. By observing and recording facts, all photographers can best aid the cause of their art-science. The value of nitrate of soda in the printing bath stands at present rather upon the accumulated mass of evidence from many quarters in its favour, than upon the ingenious theories suggested to account for the facts. We look for further testimony, and we hope that photographers who have opportunity will record the results of their experiments, undeterred by thoughtless slights or ridicule, which proceed not from a thoughtful examination of the subject, but rather from a foregone conclusion that the subject is not worth examination.

Critical Notices.

LIFE PORTRAITS OF WILLIAM SHAKESPEARE. A History of the various Representations of the Poet, with an Examination into their Authenticity. By J. Hain Friswell: Illustrated by Photographs by Cundall, Downes, and Co. London; Sampson Low, Son, and Marston.

"Among the anfractuosities of the human mind, I know not if it may not be one, that there is a superstitious reluctance to sit for a picture." This tremendous sentence of Dr. Johnson's occurs to our mind, when we inquire, Did Shakespeare ever sit for a portrait, and have we any authentic record of its existence? The questions have been often asked, and will recur with renewed interest, at a period when the public heart is stirred with a general impulse of affection to the man, whilst they wish to do homage to the poet. Mr. Friswell, in the handsome and timely volume before us, gives the fullest answer now possible to these questions, by presenting to the reader the result of a most exhaustive examination of the various portraits—we believe not less than two hundred—for which a Shakespearian origin has been claimed. Of those having any claim to authenticity, discriminating descriptions are given, and details of the evidence upon which their claims are based.

It is one of the noteworthy characteristics of this work that the reader rises from its perusal, not bewildered with the memory of a series of conflicting claims—a common result of such "examinations,"—but with a fuller, a more vivid, complete, and satisfactory appreciation of what manner of man Shakespeare was. The author has arranged his material like a skilful painter, so that the most important objects on his canvas shall arrest and retain attention, and fill the eye with the general aim of the picture, whilst accessories of minor importance, but still interesting, are introduced with a masterly power of subordination to complete the composition. The work has thus nothing in common with the bare collation of evidence which would have been presented by the mere bookmaker, but possesses a vitality and interest akin to that of a biography of the man. It must not be imagined, however, that Mr. Friswell has been writing as an advocate or partisan of some particular portrait, or as the upholder of some pet theory. He writes with an acute and scholarly impartiality, free from bias, but not dispassionate: that is too coldblooded a word to characterise the work of one who writes with a tender reverence, and an earnest and loving appreciation of his subject.

For Mr. Friswell's estimate of the various portraits we must refer our readers to the work, and we may add, for the information of those engaged in portraiture, that in the remarks on the various pictures they will find much suggestive criticism of interest to portraitists generally. A full, account of a cast now in the possession of Professor Owen, supposed to have been taken from the face of Shakespeare after death, will be read with especial interest by all the poet's countrymen. We cannot enter into detail on the portraits generally, however, further than to quote Mr. Friswell's brief summary of what appears to be authenticated facts as to the personal appearance of Shakespeare. "We may presume that Shakespeare was of the middle height, fairly built and proportioned, broad-chested and upright. His hair was a warm brown, his beard lighter than the hair of his head; his chin round and full; the jaws strong and powerful; the forehead ample, broad, and high; the supra-orbital ridges oval, and well marked; the hair at an early period thin and well off the forehead—at the close of his life he was bald, and the forehead seemed very much higher; his complexion was fair, and the tint of a warm healthy

hue, with probably a full colour in the cheeks; the mouth not very small, the lips full and red; the eyes hazel, and. we may presume, instinct with life and intelligence."

Speaking of the recently-discovered Stratford portrait, of which, by the way, we think more highly than Mr. Friswell does, he makes some remarks on photography, on the general truth of which many of our readers will be disposed to try conclusions with him, but to which, in the individual instance to which they refer, we can give strong confirmation, The large photographs of this portrait, which we examined side by side with the original at Stratford, were so singularly unlike the picture that the whole expression was altered. This was, probably, due to under-exposure and the want of bromide in the collodion. We may also add that the copy in this book is as satisfactory a reproduction as the other is imperfect. Mr. Friswell says of the large ones of which we complain that they "give really no idea of the painting, and are as untrue to it as only photographs, which some people fancy reproduce every single touch, can be. The truth really is, that unless in very skilful hands, no portraits are so deceptive as those produced by photography, because, having given up our faith to the mechanical fidelity of the art, we all the more readily become victims of our credulity." A bad painting may be much more atrociously unlike the original than a bad photograph can be: but a bad photograph may be much more *deceptive* than the painting, because it can be so near the truth and yet so completely false. Mr. Friswell's remark is, therefore, true only as an argument against bad photography, or photography in unskilful hands.

That photography in skillful hands is regarded by the author as the most perfect method of producing a trustworthy facsimile we have here satisfactory evidence in the shape of several very fine photographic reproductions of the best authenticated portraits. These consist of the Stratford bust, which has been very successfully photographed in its place in the church; the Chandos portrait, the Droeshout engraving, the Felton head, the Stratford painting, and the Jansen portrait. In addition to these we have excellent photographs of the old House in Henley Street, of Ann Hathaway's cottage, and of the interior of the Church of the Holy Trinity, giving a view in which the bust and tomb of Shakespeare may be seen. The whole very carefully executed by Cundall and Downes.

SHAKESPEARE. The First Folio Edition of 1623 Reproduced, under the supervision of Howard Staunton, by Photolithography. London: Day and Son.

Every lover of the world's greatest poet knows that the folio of 1623 was the first collected edition of his works; and knows also, that in the editions which have been published during the two centuries and a half which have elapsed since then, he has been, to quote the recent caustic words of an able writer, "commentated, expurgated, expunged, purified, nullified, annotated, edited, improved, disproved, approved," to such an extent, that it is something more than a relief to refer back to an unsophisticated edition. Various attempts have been made, some with great care, and at great cost, to reproduce the first folio, but with indifferent success, one of the most important, upon which great stress was laid as a rigid and faithful *fac-simile*, was discovered, upon a careful examination by Professor Porson and Mr. Upcott, to have between three and four hundred departures from the original.

It is in a case of this kind that the especial value of photography, as an unerring copyist, is found. To quote the words of Mr. Staunton. "In this difficulty photography does us 'Yeoman's Service.' By the aid of this unerring agent, combined with an admirable process recently discovered, by which the subject can be transferred from the collodion negative to zinc or stone, it is practicable—as the beautiful *fac simile* of 'Domesday Book' has proved—to obtain imperishable copies of any manuscript or printed book so closely resembling the original as almost to defy discrimination." There is, to our minds, something very touching in the sentiment of such a transcript as this, which connects the reader very intimately with the past period in a manner similar to the original edition itself, and gives this re-issue a peculiar value apart even from its authority for critical purposes. For the purpose of this reproduction, Mr. Staunton has been permitted to have photographic copies of the originals at Bridgewater House and the British Museum, thus securing *fac similes* of most perfect copies in the most perfect condition. The photolithographic transfers are produced, we believe, by a gentleman formerly engaged in similar work in the Ordnance Map Office, at Southampton, and the work is admirably done.

The first part contains a very fine *fac simile* of Droeshout's engraving, a portrait, the authenticity of which rests upon more satisfactory evidence than any other. Also the lines of Ben Johnson, Hugh Holland, Leonard Digges, and others, to the memory of the poet. The plays it contains are "The Tempest," the "Two Gentlemen of Verona," and part of the "Merry Wives of Windsor." It will be completed in sixteen monthly parts, at half a guinea, a very moderate price for a work of such intrinsic value so well executed in every department.

STEREOGRAPHS OF ENGLISH SCENERY. By Frances Bedford. Chester: Catheral and Pritchard.

Mr. Bedford's last issue of stereographs is timely, consisting, as the views do, chiefly of scenes in Warwickshire, a county abounding at once in natural and in architectural beauties, and in hallowed and venerable associations. Perhaps no spot in England possesses, within the area of a few miles, so much to please the eye, and call up eventful memories. Stratford on-Avon, with its homely cottage in Henley Street, and noble Church, together with the neighbouring Shottery and Charlecote—the goal of many a pilgrimage; Warwick Castle, Guy's Cliff, and Kenilworth; Stoneleigh and its noble deer-park, and the Forest of Arden; and quaint old Coventry, with its three tall spires, its treasures of ancient and modern architecture, and its legends; pretty and fashionable Leamington, with its urban charms. The county abounds with scenes famous in English history, and Nature has been prodigal of those calm beauties which constitute the genuine English landscape. Mr. Bedford has produced nearly two hundred stereographs of the scenes of chief importance in the country. In such a number we might naturally expect to find varying degrees of excellence and interest, but by far the greater number are very perfect indeed, good alike in photography and in pictorial qualities. No. 11, a view in Leamington, is a charming composition; No. 83, a view of the Avon from the balcony of Warwick Castle, is a very perfect picture, with fine atmospheric qualities; the water is transparent; the foliage well detailed; a warm sky takes the place of the usual mass of white paper; the whole is at once broad and delicate. Of course we have various views of the old house in Henley Street, inside and out, amongst which is an excellent interior of the room where the great poet was born. Various views also of the church, inside and out, some of the former including the bust. Perhaps we are hypercritical in saying that some of the views intended merely to reproduce scenes interesting from association might have been made more pictorially perfect by a little attention to the grouping of the figures present, as in No. 183, "Ann Hathaway's Cottage." As a whole, we repeat the series is excellent, and worthy of Mr. Bedford.

THE ART-STUDENT. Nos. 1 and 2. London: Hall, Smart, and Allen.

This is a new illustrated monthly magazine of the fine and industrial arts, intended as a guide to their principles and practice, edited by a gentleman whose name is familiar to the readers of photographic journals—Mr. A. H. Wall.

The work is thoroughly well intended, and it occupies ground not otherwise filled up. Many of the articles are well written, and to the purpose, and some of the illustrations exceedingly good, amongst which we may name some capital reproductions of Mr. Rejlander's photographs. There is, perhaps, more of a tendency to be fragmentary in the work than is quite to our taste; but it is easy to find fault, and perhaps unfair to judge from the two first numbers, for if a work have to succeed, it can scarcely be said to have "got into its stride," so early. Photography takes its place amongst the arts treated, the last number containing a very interesting article on photo-sculpture. Despite any little shortcomings incident to its youth, the work has so much honest, earnest work in it, that we heartily wish it success, and commend it to our readers as a very cheap sixpennyworth.

THE ANECDOTE MAGAZINE. Part I. London: Henry Lea and Co.

The chief claim which this work has to a notice in our pages arises from the fact that it is conducted by a veteran photographer; and that, as he suggests, it is peculiarly well-suited for the waiting-room of the portraitist, as a pleasant means of beguiling the time of sitters, who might otherwise be waiting in a state of restless impatience very fatal to their chances of a pleasant expression when the moment of sitting arrived. Great judgment is shown in the selection and arrangement of the contents, the anecdotes being culled from rare sources, and well told.

ON THE INTERVENTION OF ART IN PHOTOGRAPHY. Translated from the French of Blanquart Evrard, by Alfred Harrall, with an Introduction by Thomas Sutton, B.A. London: Sampson Low, Son, and Marston.

This pamphlet is a reproduction of the papers by Blanquart-Evrard, of which we gave the substance in our last volume, describing certain methods proposed by the author for improving the artistic qualities of negatives by direct photographic action, increasing the density of some parts, and lowering that of others. The especial value of this edition of the pamphlet is, that it presents the reader with a practical illustration of the results to be obtained, in the shape of two photographs from negatives treated in the manner described. The pictures are photographs of a frieze, with figures in *bas relief*, and, of course, of uniform tone, being all one plane. By the mode of treating the negative, some of the figures are made to advance or retire in a manner quite under the control of the operator. All interested in the subject should get this pamphlet, especially for the valuable illustrations it gives of the capability of the process.

Scientific Gossip.

The Magnesium Light.

We have many times taken the opportunity of urging the highly actinic character of the light emitted from a piece of burning magnesium wire, and impressing upon experimentalists and photographers that, in this metal, they had a source of actinism which, probably, was unsurpassed by any other artificial source, except, perhaps, the electric light. If we mistake not, Mr. Crookes was the first to practically apply this agent to photographic purposes, and we have seen prints from negatives taken by him two or three years ago with some of the first magnesium wire made in this country. In our Number for July 10th, 1863 (vol. vii. p. 327), we gave a very full account of the physical and chemical properties of the metal magnesium, and the brilliant light emitted by its combustion, and stated then that, as there appeared every probability of this metal becoming plentiful, photographers should utilise it for the purposes of their art. Our repeated mention of the magnesium light in these pages has, we are glad to see, been followed by a practical application on a sufficient scale to show that the difficulty of night photography may be looked upon as overcome. A portrait has been taken by its means by Professor Roscoe and Mr. Brothers, of Manchester, which was exhibited at the last meeting of the Manchester Literary and Philosophical Society, and elicited the most favourable opinion. The magnesium wire was eight feet from the sitter, and the consumption of metal was only 15 grains, which, at the present price of magnesium, would be worth about sixpence. This light has another great advantage over the electric or lime light, besides its cheapness—namely, that owing to its extreme portability it can be moved about whilst burning, and in this manner the light and shade can be toned down to any desired degree. On this account the negative exhibited was obtained fully equal to any taken in sunlight in the most favourable state of the atmosphere. During the meeting, a negative of a bust was taken in about a minute, with a consumption of 10 grains of wire.

There is one great value attending the employment of the magnesium light, which is, that the exposure in the camera may be diminished to any desired extent, by dividing the magnesium wire into short lengths, and lighting the different ends simultaneously. Thus, supposing the fifteen grains burnt in the first experiment, above quoted, lasted for 1½ minutes (and this would be about its duration, since the 10 grains lasted for 59 seconds), the exposure could be diminished to half a minute by cutting the metal into three wires of five grains each, and burning them simultaneously, or to six seconds' duration by dividing the wire into grain lengths, and burning fifteen of them at once. It is possible that this plan of acting would be inapplicable for portraiture, as the sudden blaze of light bursting from comparative darkness on to the sitter, would cause a painful contraction of the eyes, which would interfere with the pleasing character of the portrait; but for photographing interiors or still life this mode of operating would be attended with great advantages, as it would not only allow the exposure to be indefinitely shortened, but, by permitting the operator to plant the magnesium wires at different points and distances from the object to be illuminated, it would enable the shadows to be thrown in any desired direction, and of any opacity or transparency, which would be best suitable to the object photographed. The expense would be no more in one case than in the other, as fifteen or twenty long lengths of wire could be lighted simultaneously, and then blown out as easily as a candle; or, by passing a definite length through a hole in a metal plate, it could be burnt till the flame reached the diaphragm, when it would go out of its own accord, thus allowing any desired weight of metal to be burnt. A light like this, easily manageable, intensely brilliant, and not very expensive, will be of the highest value for experiments in photometry. It is more than probable that the combustion in the air, of a certain weight of magnesium, in the form of wire of a definite thickness, would be the most constant source of light yet discovered; and should accurate experiments prove this supposition to be correct, it should be resorted to as a standard in all photometric experiments, as being far more likely to be always uniform than the time-honoured standard "wax candle." Again, with this light a long-disputed point may be settled: "Will length of exposure make up for diminished light?" and do these bear any quantitative relation to each other? Whether or no this is the case, a few series of experiments will at once decide. It will only be necessary to take a negative of a fixed object—a bust or engraving, lighted by one wire at a certain distance off. Now light it by two wires at the same distance, and expose exactly half the time; then take three wires, and give one-third exposure, and so on. If time of exposure and intensity of light are accurately convertible terms, the pictures will in all these cases be identical. If they differ, the law which causes their variation will, in all probability, be shown by examination of the negatives.

Being now in possession of a constant and uniform source of light, the intensity of which can be measured out and weighed in the balance to any desired accuracy, the comparison of different collodions, baths, dry plates, and other sensitive materials, can be made with far more certainty and approach to philosophical accuracy, than is possible when the test object is illuminated with ever varying daylight, and in this manner we hope that photography will soon become a science capable of exact quantitative measurements. These are a few of the valuable applications of the magnesium light which have occurred to our minds since our attention was drawn to its photographic value some years ago. We do not doubt that when the metal is more generally obtainable, and in the hands of the great mass of our readers, numerous other valuable uses of this light will be discovered, and duly chronicled in these pages.

We understand that a company has been formed to carry out the manufacture of magnesium on the large scale, at Salford, Manchester. Considering that the ore is one of the most abundant minerals we have, and its extraction is considerably more easy than that of aluminium, the pure metal ought to be supplied to photographers at not more than two or three shillings per ounce at the very highest (at present the price is about fifteen shillings per ounce). Some propositions have been made at different times to apply this light for illuminating purposes. We scarcely think it will be available in this direction until the price is lower than the lowest sum named above. Bunsen, indeed, calculates that to last for 10 hours, giving a light equal to 74 candles, 72·2 grammes of magnesium would have to be burnt, or somewhat over two ounces. The candles in that time would consume about 20 lbs. of stearine, so that at the first glance it would seem that even now the metal is almost cheap enough for use in this direction. It must, however, be borne in mind that a rather expensive kind of lamp will probably be required, and precautions will have to be taken against the light going out; then, again, the metal is difficult to make into wire, and in this latter form it will always cost more than the crude lumps; on these grounds, therefore, we think the price will have to be only a very few shillings per ounce before we light our houses with burning magnesium.

THE PHOTOGRAPHIC SOCIETY IN BERLIN.

BY J. W. OSBORNE.

It may be interesting to your readers to be informed respecting the origin and transactions of this society, the first meeting of which was notified some little time ago in your pages. I propose, therefore, if consistent with your wishes, to supply you from time to time with short accounts of its meetings, together with my own remarks thereon, and upon German photography in general.

The photographers of Berlin owe the existence of their society, which promises to be to them a source of much interest and strength, to the energy and talents of their president, Dr. Vogel. It was absolutely necessary that the first efforts in this direction should be made by a man well known in the photographic world, but removed at the same time from direct pecuniary connection with the profession; one who was willing to take upon himself a considerable amount of work, in the first instance, at least, and whose leading and sustaining motive was a strong desire for the advancement of the art to which he had devoted himself. In Dr. Vogel these abilities and conditions have been happily combined, and the success which has attended the society's labours must now, and I trust always will be, a source of gratification to him.

As is already known to you, the preliminary meeting of a few leading photographers called together by Dr. Vogel declared the society as established, and selected from amongst themselves a provisional committee. This body decided upon the laws and rules by which it proposed to govern and manage the affairs of the society, and addressed a circular to the leading photographers of Berlin, praying for their co-operation. This call was heartily responded to, and at the meeting which ensued, the rules, as proposed by the provisional committee, were adopted *pro tem.*, their further discussion was postponed for six months, and the members of the committee themselves were requested to retain their offices, and to act for a similar period as a formally constituted council. The names of these gentlemen are—Dr. Vogel, president; MM. Beyrich, Luck, Günther, and Osborne, to which Dr. Jacobsen's, as secretary, was subsequently added. Since this general meeting, three others have been held for the transaction of business, besides one or two of a more convivial nature, and the following are some of the items of interest which transpired:—

Herr Beyrich exhibited a cup of fine porcelain, having a portrait burned upon its surface, illustrating thereby the progress which he has made in a series of experiments at the Royal Porcelain Factory of this city. He stated that for this purpose his positive paper, prepared with a movable film of albumen, was made use of, but that considerable difficulty was experienced in successfully burning in the transferred image, in consequence of the infusible nature of the glaze and the high temperature to which porcelain wares were subjected in the kiln. This difficulty was not felt to the same extent in burning an image upon enamel. The toning of prints for this purpose was a matter in which much yet remained to be done, the presence of silver giving a yellow colour, and that of gold a pale and sickly pink. The specimen submitted to the society had been toned with iridium. This method of transferring to porcelain is evidently the really practical application of Herr Beyrich's photodiaphanic paper. The specimen submitted, though excellent in many respects, did not bear a very critical examination, being deficient in the minute details and in the depth and brilliancy of the blacks; but I have no doubt of the thorough solution of the problem eventually, the effect of which will be to open up a new field of activity for the photographer.

Dr. Vogel exhibited a most interesting specimen consisting of a print taken in the copper-plate printer's press, from an etched daguerreotype plate by Fizeau's process. This proof had been produced by the inventor himself, and bore his autograph and the date, "1844." The subject was an alto-relievo group of figures, apparently from an old ecclesiastical building. This rare print had been submitted to Dr. Vogel, by the son of the late Professor Mitscherlich, the deceased gentleman having received it from M. Fizeau. Dr. Vogel hoped to obtain it for the society.

On the same evening the President laid upon the table, for the inspection of members, an interesting illustration of actinic action. A silhouette portrait had been given him for presentation to the society, which had hung for *fifty years* in the same place. It consisted of a perfectly black profile, mounted in the centre of an elaborate red border, printed upon a piece of paper of note-sheet size. A few days previously this portrait had been taken down from the place where it hung, and pulled to pieces as useless. On separating the mount and silhouette from a thin piece of smoothly planed pine wood, which was fastened to them at the back, a strong negative image was found upon the latter, not only of the head, but also of the more delicate and less opaque red border. The time of exposure had been rather long, but the image was wonderfully sharp notwithstanding, considering also that the light had had the thickness of a piece of stout paper to penetrate before it met with the sensitive surface beneath. The effect of the light had been to darken the surface of the wood, the protected portion appearing white by contrast.

In the January meeting the proposal to open a photographic exhibition in Berlin at the commencement of the summer was entertained, and a committee was appointed to consider the best way of carrying out this idea. This committee had many sittings, and reported on the whole in favour of the project; but in consequence of the warlike

proceedings in which Prussia is at present engaged, a feeling was manifested by the members generally, that the result of an undertaking of this kiud, which depended for success, in a pecuniary point of view, upon the interest taken in it by the public, was very doubtful at present, whereupou it was, by general consent, postponed to a future time.

It has been decided, however, that a monthly journal, as orgau of the society, is forthwith to appear. Dr. Vogel has been requested to establish and edit a publication of the kind, and the society takes from him the number of copies required for its members, so that, in a short time, I may have the pleasure of forwarding you the first number of this additiou to photographic literature.

In the meetings of this youug society, which have already been held, many discussions have arisen which contained matter of interest, and I have aided myself on one or two occasions by an address descriptive of the Victorian lens which Dallmeyer is making, and some remarks on the pictures by Dallas, and on other matters coming within the limits of my own researches; but although I may at a future time refer to the ideas given utterance to by some of the clever men who address the meetings, more especially as they do not always agree with mine, I must postpone them at the present time, for want of space. I should not, however, forget to mention that a valuable collection of very old silver prints and photolithographs, by Lemercier, of Paris, in the production of which the bitumen, as well as Poitevin's process has been employed, have been presented to the society by Dr. Jagor, well known as traveller in India and Java, and as one of the earliest and most successful of uegative operators on albumen.

These few remarks may serve to chronicle the origin of the first earnest attempt at harmonious action amongst the many who derive their living or their pleasure from photography in the Prussian capital; an attempt which has resulted in the formation of a society numbering upwards of seventy members, with every prospect of a useful and a long existence.

Berlin, March 2nd, 1864.

THE ACTION OF SODA NITRATE IN THE PRINTING BATH.

BY F. W. HART.

Many suggestions respecting the action of soda nitrate have from time to time been made since its introduction, the merits of which will rise or fall when tested by scientific reasoning, or perhaps by practical experience. The latter, many may say, is far the best test; but without careful analysis of the phenomena occurring around us, and inquiry into their causes, all progress would be at an end. Many medicines of known practical value would have remained as empirical preparations, to be applied at random, had not scientific inquiry sought out their mode of operation and assigned to them their proper use. When the controversy on the subject of weak baths and soda nitrate began to claim general attention, I tried a few experiments with my usual paper, aud found, with a 20-grain bath, no marked advantage in the addition of the soda. I therefore naturally asked, for discussion,—"What was the use of nitrate of soda?"*

From my experimeuts on the insolubility of the albumen surface when floated on the silver bath, I made the simple weak bath slightly more acid than is usual, as my researches led me to the conclusion that liberated uitric acid was the primary cause of coagulation, and the first contact of a weak solution, without such addition, would be more likely to remove portion of the albumen, as the experience of several persons in the indiscriminate use of the weak baths has proved. More recent and extended observation has induced me to ask myself, What was the use of the nitrate of soda in the many cases recorded of its beneficial effect? of course, giving every experimentalist the credit of having truthfully stated his actual experience. I account for it (at present) by analogy. On further thought, it appears to me to have a scientific basis, and may be explained by a consideration of the different rates at which the salts in question have the property of passing through the colloid septum of albumen. Bearing in mind that the mixture is but a mechanical one, the soda salt by its greater power of diffusing into the capillary texture of the paper, leaving the silver, and thus preventing the too rapid reduction in strength of the surface stratum of weak solution. It also takes the place the silver would have done if floated long enough for the same amount of diffusion on the simple bath. Let it not be understood that I mean the soda salt takes the place of silver in its special properties, but merely in occupying a place the silver would otherwise have uselessly filled. Should I have the time at my disposal to prepare the experiments, I hope to be able, through the instrumentality of a new dialysing apparatus I have invented, to demonstrate my views on the subject at one of the London societies.

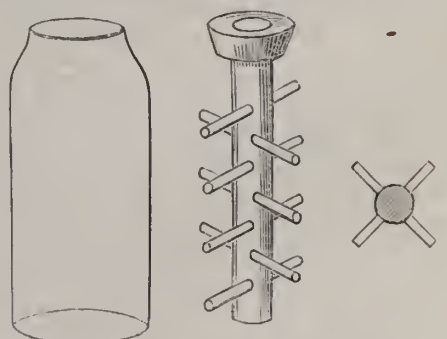
* See report of N. L. S., Photographic News, vol. vii. p. 574.

HINTS ON APPLYING A PRELIMINARY COATING OF ALBUMEN.

BY THE REV. WM. LAW.

I have been for many years in the habit of coating *all* the plates I employ iu the dry processes with diluted albumen, to obviate the possibility of the collodion film separating from the surface of the glass. The process I almost invariably employ is the tanuin, which, for ease of manipulation and certainty, as well as beauty of result, has not, I conceive, at present been surpassed.

I mix together about one part of albumen (stale, or fresh, within the range of two or three weeks, makes, so far as I can perceive, no difference), and four or five parts of distilled water; I then add the strongest "*liquor ammoniæ*" that I can procure, in the proportion of 20 minims to the white of one egg, and shake all well up together in a kind of *bottle churn*, of which I send you a rough sketch. Care must be taken not to fill more than half the bottle with the solution, or the process of breaking up and incorporating the albumen with the water, by uo means so simple and easy a thing as some may imagine, will be rendered both tedious and uncertain. With the bottle churn which I have constructed, six or eight ounces may be thoroughly frothed in three minutes. Here it is. It consists, first, of a bottle with a wide mouth—



the wider the better; to this is fitted as accurately, of course, as possible, a *bung cork*, the inside of which has been smoothly pared to free it from all gritty extraneous matter; this has a hole cut through its centre with a boring tube* sufficiently large to admit of a cylindrical wooden rod of dried ash three-quarters of an inch in diameter, fitting into it *tightly*.

When the cork is fixed into the bottle, the lower end of

* Those of our readers not familiar with such manipulations will find full instruction at p. 175, vol. iii., Photographic News.

this rod should extend to within half an inch of the bottom. Through this wooden rod I bore transversely through, and at right angles to each other, a series of holes about a quarter of an inch in diameter, and half an inch apart, extending from its lower end to about three-fourths of its length. Into these I drive very firmly little pegs of the same kind of wood, of which the length should be about the sixteenth of an inch less than the diameter of the mouth of the bottle, so as to allow of the cork and its appendage being introduced and removed, with as little loss of space between the ends of the rods and the internal surface of the bottle as possible.

As soon as the albumen is well frothed, this rod must be withdrawn, and replaced with another cork, to prevent the escape of the ammonia.

The rod should be then *immediately* well washed and dried, a precaution very essential to success in its future employment, for there is scarcely any defilement more stubbornly adherent than decomposed albumen.

When the solution has settled it ought to be perfectly clear, and if the eggs are good, and from a fortnight to a month old, it will generally be so. It occasionally happens, however, that with so-called fresh-laid eggs, a filamentary change, diverging from the germ, imperceptible to the naked eye, but traceable with a low microscopic power, extends itself over a fourth part of the albumen, and cannot be separated from the germ, and its *visible* ramifications, even with the utmost precaution. In this case, no amount either of the solvent ammonia, or of shaking, will make the settled solution clear; it will then present a slightly *opalescent* appearance, and the dried film, instead of being absolutely transparent and of glassy smoothness, will consist of a congeries of particles spread over the surface, which, although of excessive minuteness, may be perceptible, and, of course, injurious in the finished negative.

Driven into a corner by this discovery, on one or two occasions, when I could obtain only albumen of this character, I was led to devise a remedy, and found this in the addition of five or six grains of iodide of potassium to six ounces of the solution. The effect seems magical, and is completely curative. It is very interesting to watch the effect of even the smallest particle that can be introduced into a test tube full of the opalescent solution. I need scarcely add that the albumenized plates must be thoroughly dried just before pouring on the collodion, and this is especially necessary when the iodide is added.

One hint more on my method of applying this preparatory coating upon the plates. After having had recourse to various expedients for this purpose—"their name is legion—"I hit upon the following method, which is most effectual, and has been practised by me for the last seven or eight years. I use a small funnel, porcelain or glass, it matters not which, and plug rather tightly into its stem a piece of well cleaned and moistened *Turkey* sponge; by increasing or diminishing, as may be, the force employed to push in the sponge, I manage so to regulate its porosity as to allow the funnel to discharge about 50 to 60 drops in a minute. I then having poured into it out of my stock bottle, only a *little more* than will be required to coat the plate, hold the funnel *close* to its surface and spread the drops, as they fall, in a circular direction, until the whole is covered; the funnel is then inserted into the neck of the bottle, and the superfluous albumen poured back into it from the plate which is then set up to dry.

PARIS PHOTOGRAPHIC EXHIBITION.

The Jury elected by the *Société Française de Photographie*, consists of the following members:—Count Aguado, MM. Bayard, Bertsch, Cousin (engraver), B. Delessert, L. Foucault, P. Galliard, Hulot, Jeaurenaud, Count Leon de Laborde, F. de Lasteyrie, Lemaitre (engraver), O. Peligot, O. Ravaisson, and Robert (first painter at the Sèvres Porcelain Works), M. Regnault, President of the Society, M. C. Balard, President of the Committee, Paul Perier, Vice-President of the Committee, and M. Mailand, Secretary in General, form also, *ex-officio*, part of the Jury.

At this meeting, the President reminded the Society that they must fix the regulations of the approaching Exhibition. The Committee thought that the simplest way of attaining this object, consisted in submitting the regulations of the last Exhibition to discussion among the members. Consequently, the President read the regulations, and invited the members present to make their remarks upon them, and to indicate the modifications they judged suitable to be introduced.

M. Anthony Thouret called attention to Article 5 of the Regulations, which read as follows:—

"All coloured proofs, and all those exhibiting essential retouchings of a nature to modify the photographic result, properly so called, by substituting hand-work, to be excluded from the Exhibition."

"This article," said M. Thouret, "must either be taken literally, or with some modification; if, as is most probable, the latter supposition be true, it will be useful to explain to photographers what are the limits within which they can work."

The President observed that, in fact, Article 5 had been constructed with the intention of leaving a certain limit of appreciation to the Jury. It seemed impossible to construct this Article in any other way, without falling into one or the other of two extremes, both of which it is desirable to avoid—either a too absolute restriction of retouching or a too absolute authorization of it. "It is difficult," he added, to define precisely in an Article, what is understood by the term "essential retouching." It seemed impossible to authorize such retouchings only as consist in stopping a hole, concealing a scratch in the negative, &c.—in a word, simply to efface material accidents; the absolute restriction, the only one easy to express in an article, seemed to him impossible to admit; but, on the other hand, the well-understood interests of photography, and consequently, those of the Society, is to prevent hand-work being too largely substituted for photography, and therefore, in leaving to the Jury the latitude contained in Article 5, there can be no fear of the admission into the Exhibition of proofs, in which the operator has abused the priviledge of retouching.

M. Thouret asked that the question might be defined by an example. "In the spirit of Article 5," said he, "is it permitted to put an eye into a portrait?"

The President replied that he did not think it was; in his opinion, an eye might be repaired, drawing even, by defining an eye-lid, which the movement of the model had rendered too vague, to subdue too strong a reflection on the eye-ball, to retouch with moderation—in a word, with tact; but it seemed to him, that a portrait in which the eyes had been remade could not, according to Article 5, be admitted into the Exhibition.

M. Leblanc observed, that at the last Exhibition, in spite of Article 5, the Jury admitted three portraits, the heads and hands in which had been entirely remade.

M. Franck de Villecholles thought that Article 5 required to be modified. This article is very clear in what concerns retouching, having in view only the repairing of material accidents, holes, rents in the collodion, &c.; but the fact instanced by M. Leblanc proved that it was not precise enough with regard to retouches made in the design itself. According to this article, it is the Jury who appreciates; it is its judgment that limits the question; but the Article says too much or not enough—too much because it excludes all retouching on the part of operators, who, nevertheless, can thus improve their proofs, and not venturing to do so on account of the absolute restriction the article seems to imply: not enough because it admits of the possibility of a fact just mentioned. According to M. Franck, the question can be presented in the rule only in two ways, either to absolutely suppress the article, not even mentioning the word *retouch*, and leaving entire

liberty of appreciation to the Jury; or rather to prohibit retouching absolutely.

The President feared that these two extreme measures would be attended with serious inconveniences. If the rule did not mention retouching, it was to be feared that, in the absence of any restrictive clause, the Exhibition would be overrun with retouched proofs, and that photography, especially portraiture, would figure only as a recollection; if the restriction be absolute, few pictures could be admitted into the Exhibition. If they might judge by the preceding Exhibition, they could not, in the face of this severe exclusion of retouched photographs, admit of more than two per cent. of the portraits sent. He invited M. Franck to propose the terms of an article, which should be submitted to the vote of the meeting.

M. Franck de Villecholles said the Article 5 of the Regulations might be modified so as to read thus:—

"All proofs coloured, or in any way retouched, to be excluded."

He added, that he did not share the fears entertained by the President; doubtless retouching is very frequent at the present day, but in presence of the restriction he proposed, a new emulation would spring up, and photography would not fail to progress. Whatever became of his proposition, M. Franck thought that the discussion that had taken place would always possess the great advantage of throwing light on the subject, giving a little more courage to timid exhibitors to make retouches, and a little more prudence to the bold.

Several members rose at the same time to protest against the idea of absolutely excluding retouching. They feared that this restriction would damage the success of the Exhibition. M. Aimé Girard thought that without adopting any extreme measure it would be possible to give a little more clearness to Article 5, and to give more precise limits to the appreciation of the Jury. M. Girard then proposed to substitute the following for Article 5:—

"All coloured proofs, and all proofs with retouches, which the Jury may consider as being of a nature to give to the proofs qualities which they cannot acquire from photographic operations, to be excluded from the Exhibition."

M. Franck de Villecholles stated that this construction of the Article responded to his intentions; he would, therefore, support Article 5 as now modified.

The President then declared the discussion closed, and put the body of regulations, excepting Article 5, which was reserved, to the vote.

The regulations were unanimously adopted.

Article 5, as revised by M. Aimé Girard, was then put to the vote, and unanimously adopted.

M. Mailand requested to be allowed to observe that he supposed the Society, in excluding coloured proofs, did not intend to exclude enamel photographs.

The President, after consulting the Society, stated that such was the fact, and that coloured enamels would be admitted into the Exhibition.

NITRATE OF SODA IN THE PRINTING BATH.*

Mr. Chairman and Gentlemen.—Seeing there was no paper announced for this month's meeting of the South London Society, I take the liberty of saying a few words about Nitrate of Soda in the Printing Bath. I will, as a practical, but unscientific, photographer, endeavour to state a few advantages of the mixed bath of nitrate of soda and silver.

1. That a weak silver bath, with a large proportion of nitrate of soda, will coagulate albumen more readily than a weak silver bath without soda nitrate.

2. That prints, when taken from the printing frame, are much redder, and when toning, you can see how far it has been affected with the gold without its losing in colour in the fixing bath.

3. That it is more *economical*.

4. That it will cause a larger reduction on the print.

5. That it will be a saving of gold, the prints not requiring to be toned so far.

The disadvantage is not being able to tell the amount of silver salt contained in the bath (without analysis).

Now, I will endeavour to prove the 1st advantage by detailing some of my experiments. To 2 oz. of water, I added nitric acid 2 drachms, floated a piece of albumen paper, the albumen of course was removed, but on addition of nitrates of soda or of ammonia to saturation, the albumen remained on the paper. I took a saturated solution of loaf sugar, and floated a piece of albumenized paper on it; cut the paper in two; one-half I washed in water, the other I placed in a bath of nitrate of silver 60 grains. In the first, or washed half, the albumen was gone; the other half, the albumen was nearly all there, showing that a dense solution is necessary. When a piece of albumenized paper is floated on a dense solution, the albumen will float on the surface, instead of mixing with the water, so that any substance that will coagulate albumen, a weak solution will do it when mixed with the dense one. The 2nd, 3rd, and 5th advantages do not require the aid of scientific or unscientific photographers to solve; only to use their eyes and be able to do a sum of £. s. d. The 4th, I believe, will require the scientific and practical knowledge of photographers to explain. Question: When a solution of nitrate of soda and silver mixed together and exposed to light and air, a reduction takes place: what is the reduced matter? It has been said that a talented brother member of this society and I are one; I can only say, such is not the case, as is well known to your worthy secretary, and Mr. Simpson.

I must bid adieu, hoping a discussion will ensue, wherein all "unscientific" photographers will be benefited.—I remain, yours sincerely, Publicolo.

* Read at a meeting of the South London Photographic Society, March 9th.

REGULATIONS OF THE NEXT PHOTOGRAPHIC EXHIBITION.

The Photographic Society of London will open their Tenth Exhibition of Photographs about the middle of May next, in the Gallery of the Society of Female Artists, 48, Pall Mall. The Exhibition will remain open until the second week in August.

I. The Exhibition will be restricted to members of the Society, with the following exceptions:—

1. Those wishing to exhibit may do so on becoming Honorary Members for the term of the Exhibition being open, on the payment of a fee of one guinea.
2. Foreigners may exhibit, free from any other restriction than that their contribution shall be approved of by the Committee of Selection.

II. Every description of picture will be received which is the result of the photographic art alone; but pictures from painted or touched negatives, and also touched and painted positives, will not be exhibited. A duplicate picture (unmounted), for the use of the Committee of Selection, must accompany each proof sent for exhibition.

III. It is necessary that the margins of all framed photographs should be kept in moderate space, viz., not exceeding 3 inches for the largest, and 2 inches for the smaller, exclusive of frames. Exhibitors, however, are recommended to place small photographs grouped together in one frame.

IV. Pictures which have already been publicly exhibited in London will not be received.

V. Nothing must be written on any photographic mount or frame, excepting the name of the photographer, which may be done in pencil.

VI. Prize Medals will be awarded for—

1. The best portrait or portraits.
2. The best landscape or landscapes.
3. The best group or groups, or composition or compositions, each from a single negative.
4. The best architectural subject or subjects.
5. The best printed impression from a photograph transferred to metal, stone, or other material, and absolutely untouched.

VII. Exhibitors desirous of selling their pictures will be permitted to make arrangements for that purpose with the attendant in charge of the Exhibition.

VIII. Members will have the privilege of free admission, and of the personal introduction of a friend; honorary members and foreign exhibitors, for themselves only.

IX. All works intended for exhibition must be delivered at the Gallery, free of all charge, on Tuesday and Wednesday, the 10th and 11th of May; each picture must be numbered, with name and address, together with price, if intended for sale.

X. The selection of pictures, hanging, award of Prize Medals, and all matters connected with the Exhibition will be conducted by the following Committee, who have been appointed to act for such purposes:—James Glaisher, Esq., V.P.; Lieut.-Col. Stuart Wortley, V.P.; Joseph Durham, F.S.A.; C. Thurston Thompson; and Dr. Diamond.—By order of the Council. Hugh W. Diamond, *Secretary*.

Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting of this society was held in the City of London College, on the evening of Thursday, March 10th, Mr. Frank Howard in the chair.

The minutes of a former meeting were read and confirmed, and Mr. Spencer, of Cannon Street West, elected a member.

The Chairman called attention to a fine specimen of enlargement, about 3 feet by 2 feet, by Mr. Aldis, with the solar camera and lime light. Also to some specimens of enlargement, to the extent of 2 or 3 diameters, by the same method, but printed by development on albumenized paper. These specimens elicited general admiration, and Mr. Aldis stated his conviction that he should shortly be able to produce superior things by the same method.

Mr. Wall presented a copy of the *Art-Student*, No. 2.

Mr. Wall then read a paper suggesting the formation of a Photographic Provident Society.

The Chairman said the subject was of such interest and importance that it scarcely seemed the time or place to discuss it at such a small meeting. The subject was one which would, he thought, enlist the interest of all photographers, and he cordially coincided with the remarks of Mr. Wall in introducing it. He thought that as photography included a large portion of those who were not wealthy, having something of Bohemianism in its character, it would be important to secure the aid and co-operation of the wealthy members of the profession, whose influence would be of the utmost value in giving a definite position to such a project.

Mr. Wharton Simpson said that he need scarcely say such a project would have his hearty sympathy and co-operation. He had been strongly impressed with its importance and the ripeness of the times for it, when he first broached the subject in an article a few months ago. He feared that little could be done at a meeting like the present, but sow the seed, and gradually get the subject prominently under the attention of photographers. He thought it would be desirable, whilst forming a provident society involving the principle of self-help, to unite with it the characteristics of a benevolent society, in which the voluntary contributions of the more wealthy might increase the funds secured by the regular subscriptions, according to rule, of the working members. He referred to the Goddard Fund, and expressed his regret that such a society as that to which he had alluded was not in existence to meet such a case. He felt much regret that a fund like that collected, should be doled out over a few years and thus sunk altogether, when by collecting a larger sum for a more general purpose, the interest would alone have been sufficient to afford satisfactory relief to Mr. Goddard, and the principle have remained as the nucleus of a Permanent Benevolent Fund. If he could secure the co-operation of Mr. Hughes and the gentlemen with whom he had been co-operating in raising this fund, he should still like such a step taken, of course with the consent of the subscribers.

A conversational discussion on this subject, in which Messrs. Martin, Wall, Howard, Price, Simpson, and others, followed, in which a general and strong opinion was expressed to the effect that, if such a plan could be carried out, the subscribers would not only consent, but in every instance subscribe double the amount; whilst many who had not subscribed at all for an individual case, would readily aid a permanent fund, so that the interest would probably afford Mr. Goddard a better sum than under other circumstances would be secured by the division of the principal.

The Chairman then read a letter from our correspondent "Publicola," on the action of nitrate of soda (see p. 141).

After some general conversation on the subject,

Mr. Simpson read some extracts from a communication on the same subject to the Photographic News, by Mr. F. W. Hart, in which a very ingenious theory was propounded (see p. 139).

The Chairman thought "Publicola's" letter simply pointed out an ordinary law of nature, that a fluid could not dissolve anything, when you have destroyed its absorbent action. If nitrate of soda acted in that way, it might be worth while trying other bodies, which might answer the purpose better still.

Mr. Price said that, knowing as he did the gentleman signing "Publicola," and the history of his experiments with nitrate of soda, he wished it to be well understood that he had a definite idea in undertaking his experiments, and that there was nothing random or unscientific about them.

After some further conversation, the proceedings terminated.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, March 9th, 1864.

The Spanish Photographic Journal, *Eco de la Fotografia*, contains an interesting communication from Don Jose Fernandez Celis, of an experiment he made to neutralize old red collodion. He prepared 200 grammes of collodion with pyroxyline, which was already partially decomposed, and the collodion naturally turned red as soon as the iodides were added to it. To neutralize it, he added 4 grammes of bicarbonate of soda, and shook the mixture. After the lapse of a couple of days the collodion had lost much of its colour, and ten days afterwards it was yellow, and gave very good results.

Dr. Van Monckhoven remarks in the *Bulletin Belge*, *àpropos* of the positives without salts of silver prepared by M. Wothly, "that Dr Schnauss found by analysis that they were composed of gold and iron, and that it is more than probable that the proofs analyzed by M. Stas and himself were of a different preparation, for, when immersed in chlorine water, they became bleached, and were sensitive to light from the presence of chloride of silver. Whatever it be, it is much to be regretted that M. Wothly does not publish his processes. We can well understand that he desires to be remunerated for his researches, which have been lengthy and expensive. But it seems to us a means exists of attaining this aim, while securing all the honour of a great discovery, which is, to publish a book containing the process, and sell it at 20 francs the copy. This would repay M. Wothly enormously. Besides to encourage M. Wothly to take such a step, we are sure that the recommendation of such writers as Schnauss, Lacan, Davanne, Simpson, Shadbolt, Sutton, and others, will not be withheld, and that the sale of such a work will yield much more than he may suppose, without reckoning the honour he would derive from it."

Dr. Schnauss believes that M. Wothly's proofs, although without silver, must cost as much as ordinary proofs, seeing the great quantity of gold they contain. But in our opinion, M Wothly has accomplished a greater progress—that of producing permanent proofs in one-fourth the time necessary for those taken on paper prepared with chloride of silver. In that there is really a step in advance."

M. Civialé has recently published a series of photographs, representing views taken on Mount St. Gothard and in the Grisons. The negatives taken were on dry waxed paper, prepared with four parts of paraffin and one of pure wax. This waxed paper was iodized in a bath of

Alcohol at 38°	1 litre	(35¼ fl. oz.)
Iodide of potassium	32 grammes	(494 gr.)
Bromide of potassium	3 „	(46 „)

The iodizing was performed in vacuo. This mode of operating gave a sufficient delicacy for landscapes, with great stability in the results. Under varying conditions of light, temperature, and altitude of station, the time of exposure varied only from 9 to 12 minutes for negatives 11 by 15 in. He employed a Chevalier's double objective, the solar focus of which was reduced to 20 inches; the diaphragm placed between the two lenses had an aperture of $\frac{7}{10}$ of an inch.

M. Poitevin has prepared a collection of photographic enamels, obtained by the vitrification of photographic pictures, formed by covering the design obtained by the action of light upon a mixture of tartaric acid and perchloride of iron, with substances unchangeable in the furnace.

Signor Guiseppe Sella has published at Turin a second edition of his admirable treatise entitled, *Plico del Fotographico*, the first edition of which was translated into French by M. De Valicourt.

Two Berlin photographers have been fined for neglecting to deposit at the Ministry specimens of *Carte de Visite* portraits which they had published. This is an application of the law of censorship.

Dr. Kaiser, of Leyden, describes, in the *Fijdschrift voor Photographié*, a new Dutch photographic journal, his process for preparing dry collodion plates. He considers that the preparation of the pyroxyline demands especial care for dry collodion processes. Iodide of cadmium is employed for sensitizing; and if this salt contains free cadmium or oxide of cadmium, the negatives will be fogged. After sensitizing in a silver bath of 10 per cent., and washing the plate in rain-water, it is covered with the following solution:—

Absolute alcohol...	100 parts.
Acetic ether	2 „
Camphor...	½ „

The plates are dried on bibulous paper, avoiding dust and currents of air. After exposure in the camera, the plate is covered with rain-water, and developed with the following solution:—

Protosulphate of iron	1 part.
Citric acid	2 „
Distilled water	100 „

Dr. Kaiser describes also a new silver sensitizing bath, which gives extreme sensitiveness three times as much as ordinary baths. It is prepared by dissolving 250 grammes (8 oz.) of nitrate of silver in 1 litre of water (35¼ oz.), adding as much iodide of silver as it will dissolve. This solution is evaporated to dryness, and the double salt of iodide and nitrate of silver is melted, but not fused. When cold, the melted salt is dissolved in ten parts of distilled water, and filtered. If the proofs are slightly fogged, add to each 100 grammes of bath solution, a few drops of a concentrated alcoholic solution of iodine. The plates are developed with

Concentrated solution of sugar of milk...	8 parts.
Protosulphate of iron	2 „

THE PHYSICAL ACTION OF NITRATE OF SODA IN PHOTOGRAPHY.

Dear Sir,—I have read with considerable interest the remarks of several writers in the photographic periodicals, on the utility of nitrate of soda in photography. A great amount of difference of opinion appears to exist between the correspondents. One considers that the salt is beneficial in the printing bath; another believes it is useless; and all agree that, useless or not, its action is incomprehensible. By way of endeavouring to set the matter a little straight, let me assert that nitrate of soda, as recommended to be used in our "Text-Book," will give all the results there enumerated. This assertion is easily verified by experiment. But if experimenters acknowledge this, there still remains the question, why should nitrate of soda produce these results? From the earliest periods of photography to the present time, all printing has been with a much stronger solution of nitrate of silver than by *theory* is required to decompose the chloride in the paper, and allow an excess of silver salt to continue the action. Many experimentalists have observed this, and have, in consequence, reduced the strength of their exciting solutions, hoping to save by these means. But they find that, beyond a certain amount, the weakening process "can no further go," without damaging the albumen on the prints. But still, this reduced amount is *theoretically* considerably in excess of what should be required. Now, some unscientific operator steps in, and reducing the amount of silver to a nearly theoretical minimum, he replaces the salt abstracted by nitrate of soda, a neutral harmless body. He does not know *why* he does this, probably, except that he "thought he would try it," and he finds it to act, and act well, producing results equal to the old system, and *saving his cash*, a decided recommendation, other things being equal. So he writes to the journals in order that his brother workers may produce the same pictorial and financial results; he is called "unscientific," but he is at any rate good natured, and has found out a good "dodge."

Our Mr. Reynolds and myself were talking over this question one day; he suggested that the reason for this action of nitrate of soda was purely physical, and I think our scientific friends will agree to this after, have endeavoured to explain it. We will presume that 15 grains of nitrate of silver per ounce of water are, *theoretically*, abundant for sensitizing paper salted with 5 grains of chloride to the ounce. We find that, *practically*, it won't work. We must have 30 or 40, or even 80 grains of nitrate of silver in the ounce of water. But *practice ought* to agree with *theory*, and we reason that the 20, 30, or even 70 grains of silver found *practically* necessary in printing, but *theoretically* wasted, only serve to keep the solution of a certain *density*—to retain it in such a molecular condition that it shall not diffuse itself through the albumen or paper, and thus, perhaps, disintegrate one or both. But we don't want to use an expensive salt to produce a merely physical effect, and so, considering that 15 grains are theoretically enough nitrate of silver to produce the *chemical* result we desire, we add the neutral, harmless, 20, 40, or 70 grains of nitrate of soda to give us the physical or molecular state we require. Hence the rationale of our assertion. "The addition of nitrate of soda prevents the albumen from becoming dissolved from the paper, as is sometimes the case. It does not allow the solution to penetrate the body of the paper, thus keeping the print brilliantly on the surface; and it also enables a weak solution of nitrate of silver to be used to produce results equal to those of a stronger solution."

It will be almost needless for me to add, after this explanation of the use of nitrate of soda, that there may probably be other substances which will serve the purpose just as well.

I am glad to see your leader of Feb. 26 on the "Estimation of Chloride of Gold." The remarks of many respecting the gain of making their own chemicals, and the illogical conclusions about the enormous profits these chemicals yield to the wholesale manufacturers and dealers, are, to the initiated, simply absurd. They might as well doctor themselves, and chuckle at saving the doctor's fee, and exclaim at the enormous profits of the profession. The amateur chemist may be safely left to the same fate as the amateur doctor.—I am, respectfully, R. J. Fowler.

10, *Briggate, Leeds, March* 12, 1864.

[It will be satisfactory to Mr. Fowler to know that the original idea of "Publicola," in trying the mixed bath of the nitrates of soda and silver, was based upon the physical theory here suggested; and it will be not less gratifying to "Publicola" to find that without any communication on the subject, the same idea has occurred to a good chemical authority in explanation of the phenomena. See "Publicola's" letter, read at the last meeting of the South London Photographic Society.—Ed.]

Talk in the Studio.

Yellow Muslin.—Mr. Solomon has just introduced a transparent yellow muslin or gauze, for the windows of dark rooms, tents, &c. Whilst very transparent, it appears to be of a good, non-actinic colour, and well adapted for its purpose.

The House in which Shakspeare was Born.—This is a photograph for the microscope, by Mr. A. Reeves, of Tottenham Court Road. The execution is very good, but it is somewhat a pity that it should have been copied from an engraving, when so many good photographs of the house are accessible.

Eliza Cook.—Mr. F. W. Evans, of Old Kent Road, has just issued an admirable likeness of Eliza Cook, which, we understand from that lady, is the best portrait she has had. The pleasant memory of her charming lyrics, which lives in so many hearts, cannot fail to secure for this excellent likeness a warm welcome and extensive circulation. The card is published by Marion and Co.

Shakespeare's Will.—We are enabled to state that special permission has been accorded by Sir James Wilde, the Judge of the Court of Probate and Divorce, to Messrs. Lampray and Co., of Paternoster Row, to execute a photographic fac-simile of the will of Shakespeare, which that firm is about to publish in a handsome form, as a contribution to the tercentenary celebration. We understand the work will be ready in a few days.

Misapplication of Photography.—The New York papers have recently had occasion to denounce a dangerous and shameful application of photography. A "Photographic Union" has been established, the object of which seems more than questionable. "It is designed," we are informed by the *Sun*, "to become a gallery of the portraits of young females, to which will be attached the name and description of each young woman, for the avowed purpose of showing their pictures to young men, and afterwards bringing about an acquaintance with the girls whose portrait and description happen to please. For the purpose of forming this gallery, circulars have been issued requesting young women to act as agents, and bring to the author of this scheme the cartes de visite of their lady friends. To induce these agents to obtain the likenesses and descriptions of a large number of young girls, six prizes are offered, viz., $20 for the largest number brought in by any one agent before the 14th of February; $10 for the next highest number; $5 for the next; and a set of jewellery for each of the other three. We feel assured that no woman of respectability will consent to act as an agent in furthering the designs of the proprietor of this 'Photographic Union,' whose plan, if carried out, will be sure to result in the ruin of many a young girl now enjoying the confidence of her parents and the esteem of her friends."

The Saccharo-Sulphate of Iron.—The Editor of the *Photographisches Archiv* says of this salt, which we recently recommended as a developer:—"The saccharo-sulphate of iron has turned out a most excellent developer; during the present dark days it is particularly to be recommended from the fact of its producing great intensity. The negatives require no intensifying and are exceedingly brilliant. This property will enable us to employ more sensitive collodions, that is, such as produce with the ordinary developer fogging and weak pictures."

To Correspondents.

One in a Mess.—The injury to your negatives is caused by a partial solution of the collodion film by the varnish. This may be caused by a little fault in both. The same film may not be dissolved by another varnish, and the same varnish may not dissolve the film of another collodion. Some samples of collodion working very well in other respects are very prone to this kind of trouble. The remedy is either to avoid the use of a spirit varnish, using one instead in which the solvent is either chloroform or benzole. Or, otherwise, first coat the film with a thin solution of gum arabic, or dilute albumen, first wetting the plate, and then when the gum or albumen is dry, varnish with your usual varnish. 2. We have every reason to believe that the firm you name is respectable. Perhaps time is required to do the printing.

Anglo-Saxon-Norman.—The only places in this country where you can certainly procure the *Silver Sunbeam* are of Mr. Atkinson, of Liverpool, and Mr. Spencer, of Glasgow. The price is 7s. 6d. or 8s. 2. The details of the water-glass painting process for frescoes would occupy too much space in a photographic journal. 3. We are uncertain, but they are oil or varnish colours; probably turpentine and boiled oil. 4. We cannot tell you: the matter is doubtful.

Cyanide.—We should have preferred the length 11 feet, and the width 10 feet, but it is not a matter of vital importance. 2. It will be as well to carry the glass entirely over the roof, except the opaque part. Let the side be glass to within a foot of the ground. 3. See answer to No. 1. 4. Have glass in the gable front. 5. The total height should be more than 9 feet; that will do at the eaves. 6. Your general design is good.

Dawson Campbell.—Your name shall be duly entered.

Dark Slide.—The spots arise from defects in the paper. The general character of your lighting is pretty good, but there appears to be an excess of diffused light in your room, and a want of concentration. There is also, perhaps, a little too much front light.

B. B.—We cannot say who is the best man for enlarging. There are several who do the work well, whose advertisements appear in our pages. 2. Mr. Wall, Sherbourne Villa, Dartmouth Park Road, is an excellent teacher of colouring. 3. Your design for a glass-room will, probably answer very well.

C. G.—We should prefer No. 2 as possessing the balance of advantages.

Ignoramus.—Blue calico is commonly used for blinds. Or a blue woollen material, named *tammy*, may be used. 2. Sulphide of ammonia, applied to transparencies, gives a bromide black; applied after bi-chloride of mercury, it gives a more vivid black.

Indicus.—We have heard good accounts of the instrument, but cannot speak with certainty. We know nothing of the French lens you name. We are glad you find the articles of our contributor so satisfactory, and that the nitrate of soda proves so successful in your hands.

Herbert.—See answer to "Ignoramus," or read Mr. Blanchard's article on the subject in our Year-Book.

F. Tindall.—We do not think the medallion portraits will ever become generally popular. 2. If they did become common, methods of stamping them out would, most probably, be provided; at present the usual method of cutting must be employed. 3. There is no such work as you want. Your best plan will be to obtain, when you can, the pictures of able men and observe them carefully.

Nemo.—The second you name is best, by the full difference of the price. 2. Try the gold and lime bath for toning, if you want good blacks. See our Year-Book. Avoid carbonate of soda. By carefully managing your light will give good results. The picture you send is under-exposed and over-intensified.

Lincoln.—The chief fault of your transparency is under-exposure; the colour is not bad. Sulphide of ammonium is generally to be obtained of any chemist. If you fail in procuring it, you may use a very dilute solution of hyposulphite of soda, say 6 grains to an ounce of water, after the bichloride of mercury, and that will give black tones.

Dawson Campbell.—We prefer the form of stereoscopic camera designed by ourselves, and described in our 5th vol., p. 259. Mr. Meagher has made some improvements in it since then.

W. B. Nightingale.—We are obliged by your communication, but the idea is by no means new. The addition of common salt to the hypo fixing bath was proposed several years ago, if we remember rightly, by Messrs. Davanne and Girard. There is little doubt that it tends to prevent decomposition and liberation of sulphur in the toning bath. Mr. Hardwich thinks that its presence is injurious, as checking the solvent action of the hyposulphite, and thus retarding fixation.

X. M. D.—We are obliged for the long communication in which you so carefully put your case, but we cannot help coming to the conclusion that you have approached the subject with a foregone conclusion in your mind, which has warped your judgment. On carefully examining the matter, we are still at a loss to perceive the discrepancies of which you complain. The two accounts agree in their main features, differing chiefly in ours containing a greater number of the facts occurring, and fuller information. Nothing is stated that is not literally and substantially true, and nothing omitted that we know to have taken place. We know nothing whatever of the gentleman to whom you refer, and little of his productions, the preponderance of the evidence we receive not being in their favour. We never by any chance, however, voluntarily mention them, much less depreciate them, as we prefer as a rule to be silent where we cannot praise, especially where individual interests are at stake. We know nothing whatever of the "monopoly" to which you refer, as having been broken down, nor of any of the other public services of which you make mention. We cannot but regret the conclusion you announce at the close of your letter, as we regret its cause; but we must also express a conviction that the loss will be largely yours.

Novice.—Mr. Lane's former letter explains clearly enough the mode in which his toning bath is prepared. It consists of chloride of gold and water, very carefully and cautiously neutralized with carbonate of soda. Whether 4 ounces of water, or 8 ounces of water are used with one grain of gold, will merely affect the time of toning. The quantity of carbonate of soda cannot be exactly stated, because the amount of free acid varies. If the slightest excess of carbonate of soda be added the bath will not keep; hence it is not a safe method in inexperienced hands.

C. G.—The only remedy for want of coincidence between the chemical and visual focus, is a constant adjustment after focussing. Or, if the lens be used for portraiture, and used generally at about the same distance from the lens, an adjustment of the dark slide or ground glass may be made permanently.

Several communications are compelled to stand over until our next.

Several correspondents in our next.

Further contributions to the Goddard Fund in our next.

Photographs Registered during the Past Week.

Mr. Wm. Mayland, Huntingdon Cottage, Cambridge,
Two Photographs—Cambridge University Boat Crew, 1864.

Messrs. Hills and Saunders, 16, Corn Market Street, Oxford,
Three Photographs—Oxford University Boat Crew, 1864.

Lieut. H. Senior, 2nd Goorkha Regt., Rawul Pindee, Punjab, India,
Eight Photographs of the Heights above Umbeyla.

Mr. Thomas Lyley, 28, Trinity Street, Bristol,
Photograph of a Mural Monument, in Carrara Marble, to the Memory of Julia and Mary Dix, in St. Paul's Church, Bristol.

Messrs. Beckett and Willis, 32, St. Nicholas Cliff, Scarboro',
Photograph of the Old Buildings on St. Nicholas Cliff, Scarboro', now removed for the New Cliff Hotel.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 290.—*March* 24, 1864.

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A RELIEF FUND, OR PROVIDENT SOCIETY FOR PHOTOGRAPHERS.

SOME months ago we suggested the importance of establishing a relief or benevolent fund for photographers.* The idea then suggested has been followed up by Mr. Wall, in a paper on a Photographic Provident Society, read at the last meeting of the South London Photographic Society, which we print on another page. We do not think it will require much argument to convince photographers of the importance or desirability of such an organization. The great necessity in such a matter is to get a practical beginning. What is everybody's business is so often nobody's business, that, whilst the general importance of such a movement as that of which we are now speaking is admitted by all, active steps for its promotion are taken by none. We bespeak the earnest attention of photographers to the subject. We conjure them, not quite as Mr. Wall does, to love themselves a little more; many love themselves, "not wisely, but too well:" but we urge them to love themselves a little more wisely, and give some attention to a provision for their own necessities in sickness; to those of their wives and little ones in destitution and bereavement.

There are two or three considerations requiring attention at the outset, such as these:—

Shall it be a Provident or Benefit Society, based entirely upon self-help, with an organised system of relief, founded upon the usual tables of trustworthy actuaries?

Shall it be a Benevolent Fund solely, in which the volunteer contributions of the wealthy shall be distributed by a committee, under proper regulations, to the necessitous?

Or shall it be a combination of both, in which a carefully devised system of self-help shall be augmented in value by the contributions of the more wealthy devotees of photography, and who might be constituted honorary members?

Our own views incline to the latter proposition. We think the position and peculiarities of photography especially demand such an arrangement. It includes a large number of workers, who would gladly acquire a right to such a system of relief by the payment of an annual contribution; but it also includes a large number professionally engaged, who, whilst very unlikely to require such aid, would gladly become honorary members, and contribute to the funds of an association based on self-help. It also includes a very large number of wealthy amateurs, whose devotion to the art would induce them also willingly to contribute to a fund directly identified with the interests of the humbler workers, who depend upon it for their daily bread.

A variety of other details would, of course, require careful preliminary consideration, such as the qualifications for membership, and whether it should be confined to professional photographers, or be open to amateurs; the age for admission; the entrance fees and contributions, and the nature and extent of the relief; the form of government, and a hundred minor details. But the first step is to find willing workers, pioneers, who will take the first steps, and obtain co-operation. We invite correspondence on the subject.

* See PHOTOGRAPHIC NEWS, vol. vii. p. 589.

ESTIMATING CHLORIDE OF GOLD.

WE have great reluctance at all times in prolonging any controversy beyond the point at which it ceases to be instructive. The persistent tendency to mislead, which characterises the remarks of a contemporary writer, compels us, however, to explain one or two matters in which he attempts to throw scientific dust in the eyes of photographers, or rather to bewilder them with assumptions of "science falsely so called." We shall not attempt to follow him through the sea of epithet and assertion in which he flounders, but just briefly point out the fallacy of those statements, which, by their speciousness, might mislead the uninformed.

We recommend the use of absolute alcohol as a simple method of testing chloride of gold. We are asked, therefore, if we know that "absolutely dehydrated alcohol" is not an article of commerce. The writer finds it necessary for his purpose to alter our phraseology at the outset. We answer, however, that we know that it *is* an article of commerce, that we have purchased, tested, and used it. In demanding that the word absolute shall have its more stringent meaning, the writer reminds us of the infringers of the law in the recent celebrated Aniline trial, who finding the words "*dry* arsenic acid" in the specification, insisted that it must mean absolutely anhydrous, and on that ground presumed to infringe a patent. We will grant our questioner, however, that some difficulty exists in obtaining and keeping the article which he mentions, but which we did not name. Does he not know well, however, that there is little difficulty in obtaining ether free from water, and that we distinctly stated that ether might be used in place of alcohol? But in speaking of absolute alcohol, whilst we knew that the anhydrous article was not always easy to obtain, we also knew that the article generally supplied as absolute alcohol, having a specific gravity of ·805,* would answer the end with sufficient accuracy for the purpose under consideration. The method proposed was not put forward as an analytical test exact to the fraction of a grain; it was distinctly stated that accurate

* This writer appears to have had some singularly unhappy experience with dealers or manufacturers. We have generally found that alcohol supplied with the term "absolute," has a sp. gr. of ·805. He finds it vary from ·805 to ·820.

analysis was a difficult and delicate operation. But we proposed a plan whereby every photographer might easily ascertain for himself whether he received an approximation to the guaranteed quantity of gold he purchased, or whether he received half or a quarter of that quantity, as the recorded experiences of the writer in question might leave him to suspect.

After speaking of the difficulty of obtaining "absolutely dehydrated alcohol," this writer endeavours to prove that the presence of the trace of water contained in alcohol of a specific gravity of ·805, would be entirely fatal to the value of the test, because he alleges "chloride of sodium is soluble in alcohol exactly in proportion to the water present"—a statement of which a very moderate acquaintance with physics would detect the fallacy. But we will confine ourselves here to the purpose in hand. The writer in question recommends an experiment to prove that *some* chloride of sodium is dissolved by alcohol of a specific gravity of ·805: he is careful not to say how much, and treats the subject with a masterly indefiniteness. We also recommend a similar experiment, but performed with a little more care, to ascertain the amount of salt dissolved. It will be found that an ounce of the spirit in question dissolves less than a grain of chloride of sodium, and as fifteen grains of chloride of gold may be dissolved in half an ounce, or a quarter of an ounce, of alcohol, it will readily be seen that the quantity of chloride of sodium may be detected, if not absolutely, at least to the fraction of a grain.

The photographer is then told that the cost of the experiment will be more than the tube and its contents are worth. The price of methylated alcohol, sp. gr. ·805, which will answer every purpose, is 1s. 6d. per lb. of twenty fluid ounces, which is at the rate of less than a penny per ounce. As the experiment may be performed with half an ounce, or at most an ounce, of alcohol, the real cost is from a halfpenny to a penny. We will not stay to notice the childish difficulty raised as to the difficulties of breaking the tube without losing fragments, the trouble of weighing, &c., which argue an utter want of familiarity with such manipulations, or a persistent desire to deter others from attempting them.

But, we may add that, were the cost or the trouble greater than they really are, as it is not to be supposed that the photographer would be under the necessity of repeating the test with every tube, after he had once satisfied himself that he was dealing with an honest man, the extent of the cost or trouble would be trifling, compared, not merely with the saving, but with the satisfaction secured; for nothing can be more destructive to moral health, than the state of distrust and suspicion which the remarks of the writer referred to would engender, a state of mind which would lead us to exclaim with the ill-fated Moor, "I swear 'tis better to be much abused, than know it but a little."

Having, we trust, satisfied photographers as to sufficiency of alcohol of ·805 for practical purposes, and shown its cheapness, it is unnecessary to dwell further on the subject. The chlorides soluble in alcohol, we have no hesitation in saying, have hitherto rarely or never been used in adulterating chloride of gold; the statement that chloride of calcium is so used requires confirmation. The allusion to the presence of protochloride of gold, &c., we have already dealt with in a former article. It is unnecessary here to enter into the question of weights and qualities, and the distinction between pure chloride of gold, an article which cannot be sold in crystals; crystallized chloride of gold, or what the writer in question refers to as the double chloride of gold and hydrogen, or auro-chloride of sodium. The question is practically settled for photographers, by the practice common amongst respectable dealers, of selling the 15-grain tube with a guarantee that it contains 7 grains of gold. If it be ascertained that correct weight is obtained in the first instance, and no chloride of sodium is found on dissolving, as we have described, the photographer may rest with a tolerable assurance that he has obtained the amount of gold for which he has bargained.

THE ALLEGED EARLY PHOTOGRAPHS.

Some further correspondence, published in the *Photographic Journal*, and some further particulars, given in an enlarged edition of the pamphlet from which we gave some extracts a few weeks ago, do not tend to render the evidence of the early invention of photography more clear. The history of the metal plates, which, if verified in its original form, would have carried the invention of photography back beyond the possibility of question as far as 1790, recedes more and more surely into the dim region of conjecture. The statements of Price, upon which so much at the outset of the inquiry rested, are contradicted by competent witnesses at many important points, and his moral character, as recently developed,* does not, to say the least, give any weight to his assertions. The careful examination of the two living octogenarian witnesses, who might be supposed to remember something of Soho House before the alterations in 1791, has elicited no confirmation of the statement that one of the sun-pictures on metal was a view of the house in its former state. The recollection of these witnesses seems to be of a very hazy character, but so far as it is definite, it tends to disprove the notion that the photograph could have even resembled the old house. So far as the metal pictures are concerned, then, it appears the notion of an origin anterior to the discovery of Daguerre may be at once abandoned.

With regard to the paper pictures, we are, so far as any published evidence is concerned, as far from a solution of the difficulty as ever. Here are pictures, of the nature of which the ablest judges confess themselves unable to form an opinion; there is undoubted evidence that they were produced by a secret process, "chemical and mechanical;" there is undoubted evidence that in the interest of art and artists the production of these pictures was discontinued, and the secret suppressed; and that, so far as we know at present, is lost; there is evidence that the term "sun pictures" has been associated with these pictures, and there is strong presumption, from collateral allusions, that a good light was necessary to produce them. Mr. Smith says he is in communication with a gentleman who has in his possession all the private papers of Francis Edginton, the inventor of the secret process. Possibly these may throw further light on the question.

We may here mention a somewhat singular circumstance bearing upon this question. Twice since this question has been raised we have received a visit from a gentleman, inquiring if we were disposed to receive and pay for a communication which would set the whole question at rest beyond dispute. Our reply has been that we should be happy to do both. Our visitor explained that he merely acted as agent, but would communicate our answer to his principal. On the second visit he stated that the gentleman on whose behalf he called knew the whole secret, and could produce similar pictures to those about which the inquiry was now raised. He could give us no particulars himself, nor was he at liberty to mention the name or address of the person he represented. We again stated our willingness to receive and pay for any suitable communication on the subject, or, if necessary, when we saw his principal, to enter into more special arrangements. We were promised an interview or further and more direct communication; but we regret that from that time to this, now some months, we have heard nothing further on the matter.

We regret that the recently published correspondence in the *Journal*, and the further details and comments in Mr. Boulton's pamphlet, partake of such an angry and personal character, as to preclude any extracts in our pages. We can readily comprehend that Mr. Boulton may have felt some annoyance at what he regards as the unceremonious dealing with his grandfather's papers, and the direction of public attention to a matter so nearly concerning his family,

* Mr. Boulton says, that having been detected in dishonesty, he has absconded, and has hitherto eluded the police.

without, in the first instance, consulting him upou the subject. But it was by no means unnatural that Mr. Smith, regarding Price as a trusted agent, should couceive him to be quite at liberty to deal with the neglected rubbish with the dust of half a century upou it, which was passing into the hands of the waste-paper dealer. And in using a keen and caustic pen to convict Mr. Smith of unscrupulousness, ignorance, and folly, he commits an unnecessary, ungracious, and ungraceful act to a gentleman of whom we have pleasure in testifying that he has throughout the inquiry been earnest aud indefatigable in research, dispassionate, disinterested, and courteous, and manifestly only concerned to discover the truth. Mr. Smith has, moreover, been considerate of the memory of those whose correspondence has passed through his hands in the inquiry, suppressing incidents which did not redouud to the credit of those concerned, and in this respect showing more tenderness for the name of Boulton than its present representative has shown for him in return.

We have one word more to add iu relation to inquiries of this kiud. From the moment the question of an earlier origiu for photography than that usually assigned to it was raised, the inquiry has been regarded by some as antagonistic to the honours belonging to Niepce, Talbot, and Daguerre. Suppose, however, that all the points raised had been proved beyond the possibility of a doubt, we do not see that the facts would have militated in any degree against the legitimate claims to honour of these great men. A discovery or invention made, and then suppressed or lost, is of little service to mankind. That Niepce, Talbot, and Daguerre were independent inventors, there cannot be a shadow of a doubt, and as such, they possess a real claim to the honours attaching to their names, even though a dozen others had at different times made similar discoveries, but had not published them to the world. Talbot's glory is not paled by the fact that Daguerre made discoveries analogous in kind, about the same time, nor does the name of Daguerre grow dim because Talbot's discoveries were independent of his. Neither should we feel that these illustrious names suffered taint or tarnish by the indisputable discovery that photography was successfully, but secretly, practised in the eighteenth century.

NEW PHOTOGRAPHIC AGENT.

The Double Chromate of Potassa and Ammonia.

BY E. KOPP.

The potassico-ammoniacal chromate salt, either pure, or with the addition of an ammoniacal salt—the acid of which may vary according as we wish to modify the reaction, more or less—is an excellent photographic agent, as the non-decomposed salt does not attack cellulose. It is especially adapted to the obtaining of positive pictures, by means of negatives obtained by the ordinary methods.

The paper must be impregnated with a concentrated solution of the salt, aud allowed to dry in the dark at the ordinary temperature.

The paper remains yellow, aud only after a long space of time, gradually assumes an orange-yellow tint. It continues active for a very long while.

But when the paper prepared with this salt is exposed to daylight, and especially to the sun's rays, in a very short time it acquires a brown hue, becoming deeper and deeper, and more intense.

If the prepared paper is covered with an engraving, and then with a glass plate, to keep the engraving in close contact with the paper, after a few minute's exposure to sunshine, a very distinct negative picture appears on the paper. If the engraving has been previously waxed or oiled to render it transparent, or if an ordinary collodion negative be employed, two or three minutes' exposure to the sun's rays will suffice to produce a very decided effect.

If the paper be now washed in pure water, or in water very slightly acidulated, by one or two drops of acid, the unchanged chromate is dissolved; the picture is then fixed, and may be dried in daylight with impunity.

It is, however, important not to prolong the washings longer than absolutely necessary, if it be desired to retain the characteristic yellow-brown tint, and not submit it to further treatment.

It appears to us beyond a doubt, that the potassico, or sodico-ammoniacal chromate may advantageously replace the bichromate of potassa in all photographic processes iu which this latter salt is used, as for example, for gelatine, carbon, and similar processes.

It is easy to explain the reaction by which the picture is produced, and the manner in which it behaves under various circumstances, present a certain interest.

Under the influence of light, the potassico-ammoniacal chromate loses ammonia, becomes acid, aud the chromic acid acting then upon the cellulose, it partly oxides, and is itself reduced to the state of brown chromic sur-oxide $Cr\ O^2$.

This sur-oxide $Cr\ O^2 = Cr^3\ O^6 = Cr\ O^3, Cr_2\ O^3$, may also be considered as a chromate of chromium, that is to say, as the result of the combination of chromic acid with green oxide of chromium, and, in fact, even under the influence of very feeble affinities, it is readily separated into chromic acid and oxide of chrome.

It suffices for a very prolonged washing with pure water, and especially with an alkaline or a merely calcareous water, to dissolve out all the chromic acid, and only oxide of chrome to remain as a residue.

It is for this reason that it is important not to prolong the washing of the photographic pictures. The brown picture becomes paler and paler, until at last it presents only the light green tint of the hydrated oxide of chromium.

But if this ready decomposition of the compound $Cr\ O^2$ is in this respect an inconvenience, it presents equal advantages in other respects.

It permits the having recourse to operations of a different nature to strengthen the picture anew, and to fix it iu a permanent manner.

For in the chromic sur-oxide there is found temporarily fixed upon the paper both chromic acid and oxide of chromium, and each of these two compounds is susceptible of entering into new combinations, possessing a much more intense colouring power than $Cr\ O^2$.

1st. If we wish to fix the chromic acid, we have only to submit the exposed paper, previously washed, to the action of metallic salt, capable of forming insoluble chromates (even in a liquid slightly acid), and strongly coloured; such are the chromates of lead, bismuth, silver, mercury, etc.

Thus, to name only one example, in placing the photographic paper in a very weak, but clear and limpid, solution of nitrate of mercury, as neutral as possible, the picture immediately acquires an orange-brown red tint, very vigorous, in consequence of the formation of mercurial chromate.

A salt of lead, or of bismuth, gives a yellow picture; a salt of silver gives a crimson picture.

But this is not the limit of the transformation: once the picture is fixed in the state of insoluble metallic chromate, we can thoroughly wash it, in order to remove all trace of the soluble metallic salt of the white portions of the picture, and then there is nothing to prevent our submitting it to the action of sulphuretted hydrogen, or the alkaline sulphides; and thus transforming the yellow, or orange, or brown-red picture, into a black one, more or less intense. By this mode of proceeding, we perceive that the chromic sur-oxide is only the means of fixing various metallic salts upon the paper, in quantities proportionate to the intensity of the shades, which, when once fixed, may be rendered apparent by very different reactions, if they do not already, in the state of chromate, constitute a picture of a tint or hue that it is desirable to retain.

As the reactions accompanying the phenomena of colouring are extremely varied and numerous with the metals proper, which are just those which are fixed in the circum-

stances indicated, it may be foreseen that some among them may be turned to practical account. To give only one example:—If we immerse the picture formed by the mercurial chromate in a dilute solution of hyposulphite of soda, we perceive the orange-brown tint immediately pass to a black, more or less grey or brown, in consequence of the formation of the black sulphide of mercury.

2nd. Instead of having regard to the chromic acid, we may obtain new effects by operating upon the chromic oxide resulting from the decomposition of Cr O^2.

It has already been stated, that in leaving the picture formed by Cr O^2 for a long time in water, and especially in calcareous water, all the chromic acid at length gradually disappears, and there remains only the hydrated oxide of chromium upon the paper. This effect is obtained much more rapidly by washing with a warm dilute solution of carbonate of soda, or with ammonia or other salt possessing an alkaline reaction, always finishing by washing in pure water.

But the hydrated oxide of chromium acts as a mordant, and it follows from this that it is only necessary to immerse the paper thus modified into a bath of colouring material capable of being altered and fixed by the chrome mordant, for the pale green picture to come out with hues produced by this actual dyeing process. These colouring matters are very numerous, such as alizarine, purpurine, Brazil wood, logwood, &c. It may readily be imagined that extremely varied effects may be produced in this manner.

Logwood especially undergoes this transformation very readily. It is not necessary that the Cr O^2 be entirely converted into Cr^2 O^3, only to wash it sufficiently for no non-decomposed chromate to remain upon or in the fibre of the paper. The chromic acid which still remains in small quantity combined with the oxide of chrome, operates favourably in modifying the blue-black tint of the logwood. Also, after immersion in a recently prepared warm bath of logwood, the picture assumes an extremely deep blue-black tint. The whites also become strongly coloured after a certain lapse of time; but it is easy to restore them. After washing the tinted paper, immerse it in a very dilute warm solution of chloride of lime, and then the non-mordanted parts bleach very rapidly, and the picture quickly reappears. The action of the chloride is stopped as soon as the desired tone is produced, and the proof is washed and dried.

We may operate with other colouring matters in an analogous manner, modifying the operation according to circumstances, and the particular nature of the colouring material. The paper, however firm and strong it may be, presents very great inconveniences for this kind of preparation. In the prolonged aqueous baths, especially if warm, the fibres of the papers separate, and the picture loses its sharpness; and, moreover, the paper almost always contains mineral matters—such are chalk, alum, &c., which have a greater or lesser affinity for the colouring matters.

These inconveniences are inherent to the nature of ordinary paper, and to diminish them it will perhaps be useful to employ paper prepared in a particular manner; for example, parchmentized paper, so that the fibres cannot so readily separate from each other, and be exempt from matters capable of acting as mordants.

Evidently there is nothing to prevent the substitution of fine linen for the paper, and operating upon it in an exactly similar manner. The reactions we have pointed out may certainly be viewed as constituting one of the phases of the application of photography to the production of designs upon textile fabrics. Many of the manipulations which are difficult, if not impossible upon paper, present no difficulty in operating upon cotton, silk, or wool.

3rd. The compound Cr O^2 fixed upon paper and upon linen offers also another series of reactions, many of which may be turned to account. They are based upon the property of Cr O^2 acting as a sur-oxide readily abandoning its oxygen to pass to the state of oxide, and of exercising in consequence, a strongly oxydising action.

In putting in contact with Cr O^2 a body which, by oxydising, gives birth to an insoluble compound; this compound fixes itself upon all the points where it encounters the chromic sur-oxide.

Among organic compounds there are many which fulfil this condition, and which, moreover, become coloured in tints more or less deep; such are, for example, certain pyrogeneous acids, astringent substances, many anilic and naphthalic combinations, etc.

We find them also in the mineral kingdom, and to instance but one example, we shall state that upon immersing paper coloured by Cr O^2 in a cold dilute solution, and quite neutral, of a ferrous salt (sulphate or chloride), we find in a certain time that oxide of iron is precipitated upon all the places impregnated with chromic sur-oxide. The oxide of iron can now serve as a starting point for a complete series of coloured transformations, either by dyeing process, or in consequence of the production of characteristic ferrous combinations (prussian blue among others).

By associating the potassico-ammoniacal chromate with other salts readily decomposed, such as the yellow and red prussiates, we can obtain varied effects and pictures which admit of other kinds of transformation. It is thus, for example, that paper covered with a mixture of a solution of yellow prussiate, ammoniacal chloride, and of potassico-ammoniacal chromate, gives, after exposure and washing, a yellow-brown picture, which, under the influence of a perfectly neutral and dilute solution of a ferrous salt, yields pictures of a very agreeable tint, which are themselves susceptible of being modified in a host of different ways.

THE BENZOIN PROCESS.

BY H. J. NEWTON.*

The peculiar advantages of paper over glass for negatives induced me at the very beginning of my photographic experience, to repeat the ordinary processes for paper negatives. Although I found these processes to have all the good qualities claimed for them, they seemed far from being perfect—they seemed still to be capable of improvement. The defects which chiefly struck me were the slowness, and the disturbance of the surface of the paper, by the prolonged washings.

The process which I am about to describe, which has resulted from a long series of experiments, obviates in great degree both of these difficulties; the surface of the paper is nearly as little liable to injury as glass; in time of exposure I compete with dry collodion.

I describe the process by which my best results were produced, but do not claim that in all its details it is perfected. I have to ask that others will take an interest in it, and render their assistance towards perfecting it.

The paper I use is the ordinary negative paper, or the thinnest positive paper. The iodizing solution is thus prepared :—

Alcohol, 95 per cent....	...	...	6 oz.
Iodide of potassium ...	...	...	8 grs.
Iodide of ammonium	...	...	10 „
Iodide of cadmium ...	...	...	20 „
Gum benzoin... ...	...	...	1 oz.

The iodide of potassium is reduced to a fine powder, added to the alcohol, and, when dissolved, the remaining iodides are added. Finally, the gum benzoin, finely powdered, is added and dissolved. The gum benzoin of commerce varies much in quality, often containing more than half its weight of bark and other foreign matter. For this reason the exact quantity required cannot be exactly stated. The solution should be of about the consistency of collodion. After mixing, the solution should be left to settle for two or three days, when the upper part may be decanted for use.

* Read before the American Photographical Society, February 8th, 1864.

The clear solution is poured into a flat dish, and at a blood-warm temperature the paper is drawn through it, as in the process of salting. After drying, the paper is immersed for ten minutes in a sensitizing bath thus composed :—

Collodion silver bath solution ...	4 oz.
Acetic acid	1 oz.

On coming from this bath the paper is thoroughly washed, and then made almost dry by blotting paper. In this state it is laid between sheets of hard glazed paper, and subjected to the pressure of a copying press, from which it is removed as it is wanted for exposure in the camera. Just before exposure, the paper is subjected for ten minutes to the fumes of ½-drachm of ammonia and 1 ounce of iodine placed in a suitable box. The ammonia and iodine are not mixed together, but are kept separate in shallow vessels.

The time of exposure of the best negatives which I exhibit was one and a half minutes with a half Voigtlander portrait tube, with stop of seven-sixteenths of an inch. I have made portraits in-doors on the paper, and, by a comparison of time, I find that the paper requires from two to three times the amount of exposure of wet collodion plate.

Developer—

Gallic acid	6 grs.
Water	1 oz.

To which a few drops of silver solution are added in the usual way. The development takes from ten minutes.

After development the negatives are washed under a tap, using a brush to remove any powdery matter from the surface.

Fixing—

Hyposulphite of soda...	1 oz.
Water...	10 „

The fixing requires about fifteen minutes. After washing and thorough drying, the negatives are saturated with poppy oil, rubbing in the oil always in the same direction, with a linen cloth. At last the cloth is changed for a clean one and wiped dry. Next I melt a small quantity of paraffin on a sheet of glass, and upon it lay the negative, unimpressioned side down, and the paraffin soon penetrates the paper. To render the paraffin uniform I hold paper before the fire till it melts; when cold, I polish it with a clean, dry cloth. In this state the negative is ready for printing.

Instead of gum benzoin, I have used nearly all the gum resins found in commerce, but I find none which better answers the purpose.

RESEARCHES ON POSITIVE PRINTING.

BY MM. DAVANNE AND GIRARD.

Chapter VII.—Toning.*

Spontaneous Modifications of Toning Baths; their Influence on the Practical Conditions of the Operation.

§ 2. Toning baths possessing an alkaline reaction act in a different manner, and do not present the same advantages as baths absolutely neutral. Whatever be the substance adopted to render them alkaline, the modifications these baths undergo are still the same, and the result is always identical. At first yellow, they soon become colourless, in consequence of the passing of the perchloride of gold to the state of proto-salt. In the course of 24 to 48 hours the transformation is complete. When this reaction is accomplished, the toning proceeds regularly, but in proportion as it reaches its limit, the activity of the bath slackens, and when at length it is concluded, the bath has become absolutely unfitted for toning. The proof may remain in it an hour, without undergoing any change in colour.

Nevertheless, the bath is far from being exhausted; it is seldom that, during the period of transformation, we can tone more than from 10 to 15 sheets, 17 × 23, and the time during which its employment is possible is generally found limited to the 24 or 48 hours which follow its preparation.

This rapid cessation of the colouring properties of the toning bath cannot be attributed to any other causes than the extreme stability the proto-salts of gold acquire in the presence of an excess of alkali. In these conditions, the toning takes place only so long as there remains a certain quantity of gold salt still at a maximum; and if some operators have asserted that they can produce the toning with old baths regarded by them as alkaline, it is because these baths were in reality formed of neutral solutions.

Baths possessing a reaction really alkaline are, therefore, far from being exhausted when they cease to satisfy toning conditions—they still contain gold in considerable proportion. We have wished to verify directly the importance of this proportion, and have submittted to analysis two baths of this kind, which had both served to tone a dozen proofs. The first still contained 0·303 grammes, the second 0·346 grammes of the precious metal; and if we consider that each of these baths had originally contained 0·465 grammes, we perceive that, in the first case, 35 per 100, and in the second 24 per 100 only of the auriferous compound had served usefully in the toning. It is also to be remarked that in adding to each of these two numbers the quantity of gold removed by the twelve sheets toned, a quantity that we have estimated at about 0·120 gramme, we arrive at numbers very near the quantity of gold employed in forming the bath, a quantity equal to 0·465 gramme and corresponding to 1 gramme of the double salt.

The preceding analysis shows the importance photographers should attach to old gold baths, when they employ solutions containing an excess of alkali, and with what care they should collect them to extract the gold they may be still found to contain by means of processes we shall soon explain in describing the mode of treating residues, and which become useless with the employment of solutions absolutely neutral.

Baths become unfit for toning can, however, be revived and brought to such a state, that they may immediately be made available in photographic operations, by means of a method first made known by Mr. Himes in the course of the year 1862. This method consists in the addition to the colourless bath of a quantity of hydrochloric acid sufficient to bring the bath to a state of acidity: in treating it afterwards as we have indicated above, and converting it into a neutral solution by means of chalk, or alkaline by means of carbonates, acetates, &c., of soda, or acid by a weak acid after neutralization, we evidently replace this solution in the conditions of a freshly prepared bath. This transformation is due to the return of the gold compound which the colourless gold bath contains, to the state of persalt; this re-oxidation by the simple addition of hydrochloric acid, of which the yellow colour of the liquid is the proof, is very difficult to explain, if we only consider that the original reduction of the perchloride of gold has set at liberty two equivalents of chlorine, and that these two equivalents have to react upon the alkaline matters contained in the bath, to form a hypochlorite or a chlorate. These are the oxygenated compounds which, destroyed by the addition of hydrochloric acid, set chlorine and oxygen at liberty, which cause the gold to pass again to the state of persalt, that is to say, restore it to its primitive state. We can, therefore, by means of this method, restore an old bath become unfit for toning, but it must not be forgotten that the proportion of gold is found to be considerably diminished by the preceding operations, and that, consequently, we must not expect results comparable with those furnished by new baths.*

* Continued from p. 124.

* Mr. Regnault, President of the Photographic Society of Paris, informs us that he has arrived at the same result as Mr. Himes, by adding a pinch of iodine to the colourless bath. The reaction produced is the same; the iodine decomposes the chlorate, to be itself converted into an oxygenated product, and sets at liberty some chlorine which brings the gold salt to a maximum.

§ 3. Toning baths acidulated by a feeble acid, such as acetic acid, appear to possess the same stability as baths charged with hydrochloric acid. They remain yellow, and do not alter, except under the influence of light, as all auriferous solutions do, and allow a part of the metal they contain to be deposited. This stability, easily foreseen, allows them to retain the property of toning proofs as long as they contain a sufficient quantity of gold; in this respect they present an analogy with baths acidulated by hydrochloric acid, over which they have the advantage of not destroying the half tones.

Besides, this class of baths need not occupy our attention; the hues they give will not be sought excepting on very special occasions; in fact, however fine the bluish hue the proof assumes in a toning bath acidulated in this manner, it is always sure to assume a reddish hue in contact with the fixing solution.

To conclude, absolutely neutral toning baths may give rise to two modes of operating: one rapid, in which the picture is toned in a few seconds, but the presence of the perchloride of gold, the reduction of which is not yet complete, slightly weakens the proof. The other mode of operating is slow, it requires several minutes, but the proto-salt of gold which the liquor contains deposits a greater or lesser quantity of gold proportionally to the silver with which the proof is covered, and the proof is richer and more vigorous. Besides, this mode of operating permits of the almost indefinite employment of the same toning bath, without ever throwing the auriferous solutions among the residues.

Baths with an alkaline reaction work properly only during their period of transformation, while the perchloride of gold is gradually reduced; they can serve only for a small number of proofs, and must be put with the residues even when they still contain about two-thirds of the gold put into them.

Lastly, the baths acidulated by a weak acid undergo no spontaneous modification, and the conditions of their employment remain the same for an indefinite time.—*Bulletin de la Société Français de la Photographie.*

AMERICAN ALBUMENIZED PAPER AND "THE GODDARD TESTIMONIAL FUND."

We have much pleasure in inserting the following letter from Messrs. Anthony, the extensive dealers in photographic materials, of New York, to Mr. Atkinson of Liverpool. Accompanying the letter was the very handsome present of a ream of albumenized paper to the "Goddard Testimonial Fund."

Mr. John Atkinson.—Dear Sir,—We have sent to you this day, by the American and European Express Company, one ream of albumenized paper, to be sold for the benefit of the Goddard Fund. If retailed by the quire it will, of course, yield the fund more than any one man would give for the ream.

The Express Company will charge no advance on what the steamer charges them, and will endeavour to get it taken free.

We are glad to see the fund augmenting, and hope enough will be realized to make the old gentleman comfortable in his declining years.—Yours very truly,

New York, March 1, 1864. E. & H. T. Anthony & Co.

Such acts of international kindness do great honour to all parties concerned.

The paper is forwarded for sale to Mr. Jabez Hughes, at his photographic warehouse in Oxford Street, and we recommend our readers to second the charitable wishes of the donors by speedily purchasing quires or half quires, especially as they will have an opportunity of testing the quality of the transatlantic paper, while gratifying a benevolent feeling.

ON A PHOTOGRAPHIC PROVIDENT SOCIETY.*

BY A. H. WALL.

There is a subject on which I have more than once desired to address you, and, being unfortunate this month in obtaining a paper for the present meeting, I have stolen an hour or two from bed (being otherwise unable to spare time), and now lay the result before you, in the shape of a short paper, on a subject which, I think, deserves prompt attention.

Self-help is a glorious thing, but no one man is really and truly independent of his fellows. The labour of individuals, like the commerce of nations, is at once a source of self-help and a means of assisting others. Our great Creator has so ruled it, that he who is his own best and truest friend is also the best and truest friend of his race. Your selfish man, in an abstract sense, is the man who does least for himself. I decorate my person to improve my tailor's income, and by my humble attempts at intellectual refinement and improvement, the master minds of the age live, breathe, and have their being. A great picture ministers to my delight—a great poem rouses me to enthusiasm in the pursuit of things true and noble; and in purchasing such works I contribute my mite towards the creation of similar great works, which will delight and improve thousands who never heard of my existence.

But the source of all this ever-growing and expansive good is in a noble love of self, which is a very different thing from selfishness. Nations trading with other nations do so really for their own benefit, although the All-wise—as if to impress the great lesson of self-love more vividly upon our minds—ordains that the nation greatest in commerce, is also the greatest of the world's great benefactors.

I come before you, gentlemen, therefore, to ask you to love yourselves a little more; to consider how the rich become poor, how the old beg painfully the bread they regarded recklessly in their youth, and how many die miserable deaths who might have passed the days of a green old age in placid and honourable, though humble, enjoyment. In brief, I would suggest, through you, to the photographic world at large, the necessity of combining in self-defence against that grim old wolf whom we all endeavour to keep as far as possible from our doors.

Provident societies are associated with nearly every trade, calling, and profession in existence, from the humblest to the highest. Accident or illness may render the strongest of us helpless, may blight midway the most successful career, and plunge the most worthy of our little community into poverty and want.

Let me here make a digression. The Artists' Fund Society rose into being thus:—An engraver named Tagg, well known in his day, "became reduced by epilepsy, paralysis, and poverty, to a humiliating state of destitution."† Attracted by these facts, a gentleman, whose name is respected by all artists—Mr. Scriven, an engraver—also used to visit him, and solace his terrible affliction. He chanced to reach there one day, in company with Mr. Pollard, another engraver, at the moment when the very bed on which the hapless artist lay seemed likely to be taken from him by his landlord. Staying these cruel proceedings, these gentlemen were so horror-struck, that they called a meeting of their artist friends at the Gray's Inn Coffee House, where it was resolved to make a general appeal to the profession on behalf of poor Tagg. A subscription was forthwith started, letters of appeal were written and printed, and a subscription beginning with £53 2s., speedily showed signs of increasing, when the unfortunate Mr. Tagg died. Out of this accident, then, which occurred more than half a century ago, arose the "Artists' Joint-Stock Fund Society." The fate of Mr. Tagg was so startling and instructive that several artists determined to love themselves a little better, and guard

* Read at a meeting of the South London Photographic Society, March 10, 1864.

† Patronage of British Art.

themselves from such dreadful chances and possibilities. Consequently, on the 10th of January, 1810, a general meeting of painters, sculptors, architects, and engravers was held at the Gray's Inn Coffee House. Other examples illustrative of the necessity of combination to defend the poor, sick, and aged—under which term any one there present felt he might sooner or later be described—were advanced, but the result was not then satisfactory. Still the committee appointed steadily pursued its task, and it was speedily seen that this scheme embodied much good—not only in relieving the helpless, but in elevating the national and moral character of British artists, by eradicating the worst evils of poverty and sickness through the establishment of a society of mutual assurance on a then new but now common plan. With the after history of this society—a chequered one—we have nothing to do. It did its full share of good, and deserves that its shortcomings should be indulgently regarded.

I introduce this digression to point a moral, not adorn a tale. The sad case of Mr. Goddard recently introduced to our notice by our able and generous friend and fellow member, Mr. Hughes, points out just that lesson to photographers which Mr. Tagg's misfortunes pointed out to the artists of his day. It is true that photographers are, as a body, much more flourishing than artists then were; but there is an insidious enemy at the root of this prosperity, which threatens to render the profession of the photographer no less precarious than that of an artist then was, which enemy, I feel assured, is a morbid belief in excessive cheapness. The supply, as I said at the commencement of our session, is exceeding the demand, and excessive cheapness is the unhealthy sign thereof; let us, therefore, be wisely provident in time.

How much more readily would the widely-respected, though unfortunate gentleman I have named, Mr. Goddard, have accepted as a right the relief now awarded him as charity. He would have felt that those he had assisted repaid him in kind; that he had fairly purchased for his age a refuge from poverty and want, with its hundreds of attendant horrors.

I think one of our photographic societies—I will leave you, gentlemen, to suggest which—should apply its funds more particularly to this object, and issue an appeal for increased support, on the ground of this change in its nature and organisation; that the pleasant papers and discussions should be retained as heretofore; but that, in addition to this, funds obtained by the increased subscriptions of members should be increased by a new fund obtained through subscriptions from new sources, arising out of the claim of such society to public as well as private support.

The details of such a scheme, however, I leave to others, merely contenting myself by calling attention to this suggestion and urging its importance.

A NEW SILVERING PROCESS.

BY CHARLES A. SEELEY.*

A few years since, when plain paper only was used, the ordinary formula for the sensitizing bath was, nitrate of silver, 30 grains; water, 1 ounce; to be converted into ammonia-nitrate. It seemed to be agreed by all, that a stronger solution could in no way be advantageous. On the advent of albumenized paper, it was found that the methods of sensitizing must be changed. Weak solutions of simple nitrate of silver, and solutions of ammonia-nitrate of silver of any strength, were unsuccessful with the methods then practised; these solutions dissolved the albumen from the surface of the paper, and the dissolved albumen soon unfitted the solution for use. Strong solutions of nitrate of silver (60 grains and upwards of nitrate to the ounce of water), however, readily render the albumen insoluble, and have come into general use. Yet it has been believed by many that the only advantage of a strong over a weak solution was its power of coagulation of albumen, and various plans have been proposed to assist the weak solution. It has been proposed to coagulate the albumen of the paper by heat or alcohol, previous to silvering, or to add to the weak silver solution such coagulating substances as alcohol, acid, &c.; but none of these plans have received the general approval.

I have now to offer a new plan which, on account of its apparent reasonableness, should be put under test by many independent operators, and thus speedily determine its virtues. The process is simply to use the weak bath hot. In the trials I have made, I have used a bath at 20 grains, at a temperature of about 180°. The results were fully equal to those made at the same time with a cold bath at a strength of 75 grains. The paper being laid on the bath, at once flattens out, and hugs the surface; the silvering appears to be completed in about half the usual time.

For practical directions, the following will probably be definite enough for the present. The bath pan should be heated on a water bath, the water bath having nearly the same length and breadth as the pan, and being provided with a stand, or feet, to accomodate a lamp for heating. Perhaps it would be better to have the water bath provided with a flat top soldered on, with a tube for the outlet of steam. In beginning operations, it is well to first rapidly heat the silver solution in a glass flask, or other suitable vessel, and then pour it into the pan at the top of the water bath; in this way, unnecessary evaporation of the solution will be prevented, and time will be saved. Ordinarily, I would suppose that the weakening of the bath by use would be nearly compensated by the evaporation; but a material variation in strength would easily be detected and remedied.

I have not yet tried a bath of simple ammonia-nitrate, but I know of no reason why such might not be successful. The bath I used was at 20 grains; it probably will be found that a strength of 15 grains will answer nearly as well.

There is this special advantage of a heated over a cold solution, that it is constantly in motion, and thus the strength is equalized; the solution in contact with the paper, having its silver abstracted, is at once replaced by fresh solution. Thus, the mealiness which ordinarily occurs with a weak, cold bath, I conceive will be prevented.

New York, Feb. 6th, 1864.

* Read before the American Photographical Society, Feb. 8th, 1864.

ALCOHOL AND ITS ORIGIN—Continued.

Being Short Lesson in Photography.—No. 22.*

It has been observed that starch, either by natural or artificial chemistry, may be converted into a saccharine substance, and that the latter, by similar means, in its turn is changed into alcohol and carbonic acid. The evolution of carbonic acid during the alcoholic fermentation becomes, therefore, a criterion of the progress of this change; and its cessation, consequently, indicates the termination of the saccharine change.

The liquid or wash now contains alcohol; and our next task is to separate the latter from the former. This is effected by distillation. It is not always possible to make the separation of two liquids by the method proposed; for if the temperature of the boiling points of two liquids be identical, it is evident their vapours will be generated cosentaneously, and will both pass over through the condenser at the same time. In such a case the only good produced by distillation, would be a rectification from impurities of a solid nature, that might be present in solution. But the points of ebullition of alcohol and water are very different, that of the latter being 212° Fah., whilst that of absolute alcohol is 168·5° Fah.

If, then, a mixture of alcohol and water be exposed in a retort, connecting with a condensing apparatus, to a temperature of about 174° Fah., the vapour of alcohol alone will, in a great measure, be the result of the distillation; whereas, if the temperature be raised to the boiling point of water, the combined vapours would be evolved and condensed at the same time.

Owing to the difference of the density of the vapours of alcohol and water, however (the specific gravity of the latter being 0·622, and of the former 1·601), we account for the

* From *Humphrey's Journal*.

apparent anomaly made manifest in the distillation of a mixture of water and ardent spirit at a very low temperature, —thus, for instance, it is ascertained that the boiling point of anhydrous alcohol is higher than that of alcohol which contains two or three per cent. of water. This circumstance accounts for the fact, that it is impossible by distillation and redistillation alone to obtain anhydrous alcohol. The strongest alcohol that can possibly be obtained solely by these means contains still about 11 per cent. of water, and has a specific gravity of 0·825.

From whatever source alcohol may be obtained, it also contains an aroma peculiar to that source; for gin, brandy, rum, whisky, arrack, etc., are all dilute specimens of this ardent spirit, their difference depending upon a slight admixture of a volatile oil emanating from the grain, the fruit, or the adventitious or intentional substances contained in the wash. This volatile oil has been denominated by the Germans *fusel oel*, which we have translated into *fusel oil*—it has been called, when obtained from a wash from corn, *oil of grain*.

This fusel oil is obtained towards the end of the distillation of the spirit; and where it is intended to obtain it in quantity, the latter part of the distillation is reserved or kept separately, when there will be found to exist on its surface a super-stratum of an oily liquid, which may be removed by decantation, or by means of a tubulated funnel. Fusel oil is a hydro-carbon, and contains 5 equivalents of carbon, 6 of hydrogen, and 1 of oxygen. It is asserted that 500 gallons of corn spirit will yield about 1 gallon of this volatile oil.

The presence of fusel oil in spirit or commercial alcohol, is indicated by means of colourless sulphuric acid or a solution of pure nitrate of silver. A few drops of the former, when added to a specimen of spirit containing the oil of grain, communicate to it a reddish tinge. The same red tinge is produced by the addition of a solution of nitrate of silver, and by exposing the mixture to the direct rays of the sun, or to a bright, diffused light for a number of hours. If, after the expiration of this exposure, the alcohol or spirit be filtered, it will no longer yield a red tinge, by either of the tests just mentioned.

By rectification with caustic potash, or after digestion over freshly burnt charcoal, or the treatment with nitrate of silver, spirit may be obtained free from fusel oil.

The reader will see, from what is here mentioned, that there is something more than ordinary distillation to be performed in order to obtain pure alcohol.

The method formerly adopted was simply to distil as long as spirit came over, the distillation being performed at a temperature near that of boiling water; the products of this first distillation were denominated *singlings*, or *low wines;* by a second distillation the dilute spirit became concentrated, and in this condition handed over to the rectifier. Towards the end of the second distillation the volatile oil, already alluded to, would give the spirit an empyreumatic and unpleasant odour and taste, if allowed to distil over; more generally, however, it is allowed to remain, or, if distilled again, is condensed in a separate receiver.

The improvements in more modern distillations consist in passing the vapour of the distillate through a condensing apparatus contained in a vessel maintained at a temperature of about 174°; by this means the aqueous vapour, which rises at the same time with the alcoholic, is condensed in the first condenser, whilst the alcohol itself still continues its course through a second worm, maintained at a low temperature by cold water.

By such means, and by a repetition of distillations, alcohol can so far be strengthened as to have a specific gravity of ·825, and to containing in this condition about 90 per cent. of anhydrous or absolute alcohol. This is the alcohol which is retailed in most of our drug stores as 95 per cent. alcohol. Such alcohol, photographers, you buy very frequently, and manufacture collodion out of it; and the result is, your collodion films are streaky and not homogeneous, and your silver bath, after use, becomes red when exposed to the rays of the sun, as if it contained fusel oil.

Such alcohol ought not to be used.

Preparation of Absolute Alcohol.

If alcohol has been rectified, it is supposed to be tolerably free from fusel oil, as also from any acid or alkaline reaction. It is well to test the specimen in question for the presence of corn oil, alkali, or acid, and act accordingly for their removal.

Several methods are recommended for the preparation of absolute alcohol, all of which consist essentially in the admixture of some salt or substance which possesses greater affinity for water than is possessed by alcohol. Such substances are carbonate of potash, chloride of calcium, caustic potassa, and freshly burnt lime. Others might be added to the list.

Take a gallon of the purest and strongest commercial alcohol, and three pounds of well-dried pearl ashes, whilst still hot; pulverize the latter and mix it intimately with the alcohol, and set it aside in a closed vessel to digest for a day or two; then decant the supernatant liquid, and distil off 15 pints. Secondly, take 2½ pounds of freshly burnt quicklime, pulverize it, and add the still warm powder to the 15 pints of alcohol; shake the mixture well, and heat it over a sand-bath, taking care to insert a funnel into the neck of the mattrass, or to apply some other expedient in order to condense the vapour as it rises, and to return it into the mixture. When cool, and the lime has completely subsided in a well-closed vessel, decant the liquid a second time, and distil off 14 pints.

The alcohol now will have a specific gravity of ·794, and will be entirely deprived of water.

To ascertain whether the resulting distillate is absolute alcohol or not, add to a couple of drachms of the liquid a small piece of anhydrous baryta, which will remain unchanged if the alcohol is free from all aqueous admixture, otherwise the baryta will fall to powder.

The residual quantities, after the two distillations, can be distilled off and added to another quantity of the rectified commercial alcohol for a second operation.

Before any attempt is made to prepare absolute alcohol by the method just described, it is advisable to ascertain whether the rectified spirit contains any of the fusel oil above alluded to; and if it does, the labour becomes increased. In this case digest a gallon or two of the spirit over freshly heated animal charcoal, for a day or two, in a closed vessel, then distil off until the residue is thick and nearly dry; finally test with nitrate of silver as before described, and act accordingly.

Properties.

Alcohol, prepared as just described, is a colourless, transparent, and volatile liquid; its odour is agreeable, and it has a hot burning taste. Its density is ·794 when compared with that of water at a temperature of 60° Fah.; the density of its vapour compared with that of air, is 1·6. Absolute alcohol has never been frozen. Alcohol is very inflammable. It burns with a blue flame, and the products of the combustion are water and carbonic acid. The colour of the flame is a test in some measure, of the strength of the spirit; for the flame assumes a yellow tinge when the spirit is diluted with water. It boils at a temperature of 169° Fah. It dissolves oils, resins, extracts most of the alkaloids, &c. It has great affinity for water, and abstracts it from living tissues, as also from the solutions of several salts.

Experiments.

Take a couple of drachms of collodion in one test tube, and a couple of the same substance in another. To one of these add absolute alcohol to any amount; it will be found that the transparency of the collodion is not changed by this addition; the collodion simply becomes *thinner*.

Secondly, add to the other test tube water drop by drop; what is the result? The collodion becomes *thicker* on the

addition of water, it finally curdles or coagulates; and the cotton appears again to be deposited in its original fibrous condition.

Deduction.

Some of the iodides, as, for instance, iodide of potassium, are but sparingly soluble in absolute alcohol, and being pulverized when mixed with the plain collodion, would be liable to produce, by reason of their insolubility, transparent apertures during development and fixing. The remedy, however, is quite easy; use only such iodides and bromides as are soluble in this menstruum, and reject iodide of potassium and its congeners entirely.

Physiological Effects.

The effects of alcohol on the animal frame are somewhat similar to those of the salts of cyanogen or of morphia; and it is sometimes a difficult task to diagnosticate which of these has been the main cause of the baneful results produced. Plants are soon destroyed when immersed in alcoholic beverages. In like manner, all animals that live in water die with great rapidity when immersed in spirits. The chemical effects of alcohol, when imbibed, are manifested by an absorption of water from the tissues with which it comes in contact; hence the great thirst which it produces, and the folly of drinking more ardent spirits to quench that thirst—it is simply adding fuel to the fire. It corrugates or constringes the tissues, and thus produces a sort of crispation or singeing of the parts, such as would be produced by the application of a hot iron; hence arises the burning irritation and inflammation of the parts, and the consequent nervous excitability aroused and called into requisition to guard against the assault. The warmth which the imbibition of spirituous liquors produces is that of incipient inflammation, and the consequent arousing of the nerves to repair the evil. Nervous excitement reacts upon the circulation as a tool instrumental in producing repair; hence the rapid circulation, the increased frequency of pulsation, the flushing of the face, the flashing of the eyes, and in general the increased animation. These, in their turn, predispose to joy and pleasure, until the vital powers finally become exhausted by exhilaration, and, according to the intensity of the alcoholic action, yield the body up to sleep, insensibility, coma, or death.

PHOTOGRAPHY AS AN INDUSTRY.*

Almost as numerous and as various as the scenes that the orb of day itself shines upon are the sun-pictures we see in our stationers' windows and in every house we visit. How few of us who remember distinctly the first efforts of photography in taking the imprints of feathers, leaves, and bits of lace would have predicted from those childish essays, so great, so wonderful, so rapidly produced, an industry as photography has now become! Not that we are at all disposed to sing an unmitigated praise of photographers or their pictures, for with thorough artist's feelings we see in their ordinary productions the defects of composition, the absence of that picture-painting of unspoken thoughts, and the want of many another quality that goes to make a perfect picture, while we as painfully perceive in many a way the deleterious effects of their productions on the prospects and qualities of painter-artists; but its good outbalances its evils, and photography flourishes and increases. A portrait is, however, not a likeness, *because* it is taken with a lens on a chemical preparation. The so-called portrait may be, often is—oftener perhaps is than not—a greater or less distortion. Strong lenses are used for portraits to make the figure stand sharply from the background, and these, unless worked by the best opticians (and there are far more bad lenses than good ones), distort the features, especially in making the nose and other prominences improperly large in respect to the rest of the face, such as we may see in caricature proportions by looking at our own on the back of a spoon. Landscapes, for which flatter lenses are used, fail more generally for want of delicate chemical manipulation, which shows itself in the absence of those slight gradations of tint that give air and distance to all natural scenery. It is not, however, our intention or our wish to dwell on the difficulties of photography; we admit them to be very great. The most beautiful face may be spoilt by a very little distortion, and the finest landscape as we see it may be marred by some slight defect, defaced by a single blot. The painter-artist, too, draws on his imagination, and puts in groups of pleasing figures where no figures were, and adds to the scenery he copies thoughts and fancies not less charming of his own. But the photographer has before him Nature as she is. The clouds may blacken the landscape where he wants it pale, or the sunlight may not fall exactly as he wishes; some ugly object may come full in sight, or some slight projection obscure a telling point of the view; he cannot leave the ugly object out, he cannot raise his instrument as he could his head above the obstruction; the camera is his brush, and the sensitized paper his solitary colour; and neither his brush can he handle, nor his colour can he mix, as he wishes or as he likes. Each has a way of its own; each is inflexible, intractable, and cannot be bent or turned from its rigid exactness. What is bad the photographer must hide or put out; and this, too, with whatever materials or means may be at hand. With such difficulties in his way, and besetting him at every turn, the wonder is how much that is really artistic has been done. We now have most admirable works by Mayall, Claudet, and some few others, in whose miniature portraits we see every feature charmingly portrayed, and the characteristic action or the familiar look, even to a smile or a frown, successfully caught by the operator, who must not only be a good artist but a good chemist to achieve such results. It is not a little curious to observe the social effects of these solar-chemical operations in portrait-taking in the world at large. The old miniature painters, as a class, have already died out, and the like of the exquisite stipplings of Ross, Andrew Robertson, Chalon, Stuart, Thorburn, and Newton are now nowhere to be seen; and, although one cannot regret that the race of daubers of both great and small deformations of the "human face divine," who in the days of our youth earned competent incomes by the practice of their worthless, unpictorial libels, should be extinct, one can but grieve that there should be no encouragement at all for the production of such exquisite gems as those of Miss Coutts by Ross, the Empress of Russia by Mrs. Robertson, *cum multis aliis* of our nobility by those exquisite artists we have named. But if we have lost something in artists, we have gained something in gratification. If our curiosity be excited by daring deeds or prominent actions, the lens and the chemical paper present the doer and the place to our eyes, and we see what manner of man he is and where the event took place. Our kings, queens, and princes, our statesmen and scholars, our pretty women and our mountebanks, may be bought for eighteenpence a piece—genuine likenesses; for the lower-priced articles may or may not be such. Is there a Royal marriage, instantly a Mayall produces *cartes de visite* of the Prince, his bride, and all the bridesmaids; and in the provinces Burton and Sons, of Leicester, rival the best of London houses with pictures of presents to the Princess—his exquisite photograph of the Birmingham silver table falling short in colour only of more than could be done by Lance's inimitable skill. Is there a "world's fair" at Kensington, the London Stereoscopic Company gives us mementos of every department of the busy scene, and of the machinery, sculptures, wares, and pictures in it. Or their artists follow our future king to his private retreat, and send amongst his people's homes thousands of views of Sandringham. Every kind of scene, every sort of being, from man to oysters, and seaweeds to monkeys, from ripples on the shore to palaces and churches, are thus produced not only in our own and in lands around, but in countries far away. The scenes of ancient grandeur that Karnak and Thebes present in ruins, and those in Palestine made holy by the memory of the presence of the Divine founder of our faith, are laid before us with the most marvellous fidelity and the utmost pictorial beauty by a Bedford; while the faithful transcripts of wonderful scenery of Switzerland and the Alps, delicately rendered by the Parisian Bissons, are imported by hundreds by Mr. De la Rue. Nor are these recordings of scenes and scenery left solely to artist-traders or traders in art. Amateurs bring home from their travels not the least valuable—perhaps the most so—of these nature-records. From tropical Africa and polar Spitzbergen alike these pictures come. Pictures of mountain and moor, of desert, ruin, and forest, of mountain peak and pass

* *London Review.*

of glaciers and flowing river, of savage chieftain and unclad aboriginal, and samples of the many kinds of man, and these the works of many a traveller, usefully find a way into the world through the Amateurs' Society.

There is nothing perhaps more laborious than drawing architectural details, and there are few things that people generally feel more interest in than ancient buildings. The fine cathedral and the beautiful church—built in days when, whatever the faults of the monks, men strove earnestly and well to make their houses of religious worship as worthy as human art and human hands could make them of the great Being to whose honour they are dedicated—are the first-sought objects of the tourist; the ancient castle, with weather-beaten battlements and towers exciting memories of past history, comes next; while a mouldering house of three or four centuries ago is cherished as a domestic relic of our ancestors in an age when tables and chairs were stouter than cabinet-makers now produce, and photographers were not. These all require in their pictures thousands of details, from the form, size, and aspect of a stone or brick, to every cankering touch Time's ruthless hand has put to the florid sculpturing of the lofty façade and the innumerable chiselings of the mouldings. Such labour and such skill as this requires was rarely bestowed, and if bestowed was costly in the extreme and ranked amongst the highest efforts of art in the hands of Roberts and such like men. Here and there and now and then some enthusiastic architect made sketches of some bit or portion as an example of the rest, but all this was desultory and fragmentary; we were never sure that the face or form of the statue was correctly given, the tracery exactly outlined, or the mere builder's work truthfully rendered. And here photography has done real good service. We may regret the sudden blackness of the shadows under arches and doorways, the want of perfect clearness in the half-lights, but the main mass of the portion of building taken in by the camera is rendered in the photograph with such perfection of detail, as no human patience could attain to, no hand acquire the power of rendering. The exact symmetry and proportions are retained: every film flaked by the winds and weather from the once smooth stone, every roughness, every joint, crevice, and cranny comes out, and half effaced bas-reliefs often appear with more distinctness than in the object itself, the slight condensing of the rays of light by the lens, and their consequent stronger action on the silver salt producing intenser chemical action, and consequently more power of defining shadow. The smaller views of buildings are of course no more than other views; but to these the stereoscope gives advantages no mere artist's sketch could possibly possess; while the larger photographs by the Bissons and others—such as the Escalier de François Premier in the Château de Blois, the Hôtel de Ville of Louvain, the Church of St. Ouen, and the pinnacles of the Palais de Justice at Rouen, the apsides of Bayeux and Caen Cathedrals—are not only works of art, but transcripts of the highest interest and value to architects and antiquaries, so much so as to have given rise to a special society for their production and distribution. The still larger details of the statues over the central doorway of Notre Dame, by Bisson, in which the figures are 13 inches in absolute height, even more decisively show how appropriate and useful the photographer's art is for such purposes. In Mr. Bedford's charming scenes in Egypt and the Holy Land, taken during the travels of the Prince of Wales, there is the same remarkable clearness and precision of architectural details, although his pictures are on a far smaller scale than those we have referred to, and this notwithstanding his great and successful efforts to pictorialize his views. In this latter respect his use of his optical instrument, his judicious choice of figures and selections of their positions, with the various delicate and unexposed manœuvres to produce effects, and the tender manipulation of his pictures, render them merely works of art, and take Mr. Bedford out of the ranks of manipulators, and place him in that of true artists.

Pictures, too, have been already subjects for photographers. It is true we only get a sepia-like sketch of that which is gorgeous or sombre with colour in the original painting, according to the subject, and thus lose half the effect the artists had produced. But even this is much. Engravings, whether on metal or wood, are costly, and, like photographs, deal only in black and white; moreover, the copyist has to reduce in size; and his drawing is therefore very likely to be inaccurate and out of proportion. So far, then, in this respect, photography is a gain. If the mere sight-seer enters a picture-gallery, and wishes to bring away some mementos of what he has seen, he cannot have them in a more accurate, cheaper, or more convenient form than as photographs on paper. For the artist such photographs would convey all that perhaps he wanted to remember, except colour, which a few pencil-notes would supply sufficiently for him. Engravings, too, are costly, and must be good and careful to be of value; so that, for pictures, photography seems a highly fitting means of illustration. In proof of this, we have but to show the photographs of Bingham or Michelez. The copies of "Le Rencontre de Faust et Marguerite," by Tissot, the "Et in Arcadia Ego," by Boulanger, "Les Sirènes," by Barrias; the "Madame Mère," by Müller; the "Au Bord de la Mer," by Lehmann; the Traversée du Hâvre à Honfleur," by Biard; the "Chien de Temps," by Horace Vernet; "Les Joueurs d'Echecs," and "La Rixe," by Meissonier, photographed by Bingham, are equal in their pictorial results to engravings, and preferable in many other respects, especially in that they give us something evident of the feeling, touch, expression, and peculiarity of the artist's pencillings in the original pictures, and which are more or less always lost in the individuality of the engraver's touch. Equally good are the photographs by Michelez of "The Stolen Child," by Schlesinger; the "Promenade du Luxembourg au XVIIIe Siècle," by Monfallet; "Une Lessive à la Cervara," by Curzon; the "Manon Lescaut," by Charles Hue; the Troupeau de Moutons," by Jacque; the "Norwegian Bride," by Tidemann; and "A Street in Antwerp," by Jules Noel. Prize pictures and the new works of modern painters, as well as the pictures of the old masters, may thus be rendered familiar in every household where the inmates are educated: and controversy with the fine and more subtle picturings of the human imagination can but be conducive to intellectual habits, and to the development of those finer and more sensitive feelings which are the priceless pearls and ornaments of human existence.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, March 22nd, 1864.

At the last meeting of our Photographic Society, M. Regnault, the president, reminded the members that the competition for the prize offered by M. le Duc de Luynes closes on the 1st of April next, and that no proofs will be received subsequent to that date, under any pretext whatever.

Our society has, as you are doubtless aware, instituted rewards, in the form of medals, to be distributed annually to those who have in any way contributed to the improvement of the art of photography. The first distribution of these medals was to have taken place in February last, but it was postponed on account of the derangement caused by the removal of the society's *locale*. The ceremony is to take place at the June meeting of the society.

M. Despaquis, the Swiss photographer, whose advent with a perfect carbon-printing process I mentioned in a recent letter, has converted several of our most eminent photographers to the adoption of his process, and the renunciation of silver salts. The cartes de visite printed by this process, by MM. Bengham, Kerr, and other celebrities, after a few hours' initiation, are truly admirable for their vigorous tone, chiaroscuro, half-tone, &c. This is an immense triumph, due, it appears, to a new preparation of gelatine paper.

M. Kopp has produced a new photographic salt as a substitute for bichromate of potassa. It is a double chromate of potassa and ammonia, very sensitive, and gives permanent pictures, varying in colour according to subsequent treatment with metallic salts, organic colouring matters, &c. This potassio-ammonio chromate is obtained by acting upon bichromate of potassa with caustic ammonia; it crystallizes either in long, thin, transparent needles, and of a light sulphur-yellow colour, or in four-sided prisms, apparently with a rhomboic base. The formula of this salt is $Cr\,O^3, KO + Cr\,O^3, H^2N, HO$.

M. Dulas had recently the honour of exhibiting before their Imperial Majesties, his new processes of engraving, based

upon the observance of certain phenomena of capillarity. The principal experiment performed at the Palace of the Tuileries may be described as follows. A plate of copper, upon which a design has previously been made in lithographic ink, receives, under the action of the pile, a coating of iron, which is deposited only in those parts of the plate not covered with the ink, this latter is removed by means of benzine; the whites of the design are represented by the coating of iron, and the blacks by the copper itself. The plate is now immersed in a bath of cyanide of silver. Under a galvanic current the silver is deposited upon the copper to the exclusion of the iron portions. In this state of the plate, some mercury is poured on its surface, which adheres only to the silvered portion, and rises in relief where originally, the lithographic ink was found. A cast is then taken of the plate, either in plaster or melted wax, the hollows in which present the counterpart of the raised portions in mercury, representing a kind of line engraving. This cast is not sufficiently strong to endure the action of the printing press, but by metallizing this kind of mould by an electro-deposit of copper, we obtain an exact reproduction of the raised portions originally formed by the mercury, and in a manner a matrix, by means of which, an unlimited number of plates adapted for printing from may be obtained. If a typographic plate is required, in which the lines of the design are in relief, the plate of copper, on leaving the hands of the draughtsman, receives a coating of silver, which is deposited only on the parts free from printing ink. We remove this ink by benzine, and oxidize the parts originally covered by the drawing, and continue the treatment indicated above. At the end of the operation, the electro-chemical plate intended for printing from has the raised lines corresponding to the lines of the drawing, and its hollows are the thicknesses which the mercury had formed around the lines of the same design.

This process, which is the basis and starting point of M. Dulos' invention, has led this artist to simpler methods, which were also exhibited on this occasion. In these last methods, now become the object of an important branch of industry, fusible metal or an amalgam of copper is substituted for the mercury, giving quick results and a remarkable degree of perfection.

This invention has been noticed with special favour by the *Académie des Sciences* and the *Société d'Encouragement*, presided over by M. Dumas, and the interest exhibited by the Emperor on the present occasion worthily crowned the ten years of experiment and persevering study of the inventor.

Photographic Notes and Queries.

Retaining the Specimens of Operators.

My Dear Sir,—I beg to call your attention once more to the iniquitous system of retaining specimens sent in reply to advertisements.

Some weeks ago you advised the enclosure of stamped and directed envelopes.

Now, I did so in reply to an advertisement in the News a fortnight since, and, as yet, have had not the slightest reply.

I am acquainted with a young man who, two months ago, had a good stock of specimens, and who now has not one.

I also know, for a fact, a photographer who had some score answers to his advertisement, and who, as he says, has not time to bother about returning them, though in most cases he has stamps to cover their return.

Another one, I know, has used some of the best to fit out his specimen case.

Can there nothing be done, for I find that I am not alone in my experience, as most operators complain of the same.

Apologizing for troubling you to this length, I am, dear sir, yours, &c., A Sufferer.

Islington, March 9th, 1864.

[We can scarcely conceive that any one would be so mean as to retain the specimens sent to them by operators, except through culpable carelessness. It is an evil for which we do not at present see a certain remedy.—Ed.]

Photographic Exchange Club.

My Dear Sir,—I am very glad to see, by your last number of the Photographic News, that several of your subscribers are wishing to organize a Photographic Exchange Club, and if, at the same time, it was converted into a General Photographic Club, with something like the following arrangements, I believe it would suit a great many. Say, to number, first of all, 50 to 100 subscribers, to have a room to meet at once a week in some central situation, either near to London Bridge or Charing Cross, at about seven o'clock in the evening, every alternate week, for every member that thought proper to bring with him those prints he wishes to exchange. If each member then places his prints on a table so as to occupy, between the exhibitors, what space there is to divide, for the first half-hour or hour of meeting, each would see what the others had to dispose of; and after that time they might be at liberty to take them up and make any exchange with the other members present they thought fit.

This would give great amusement, and tend to make every one turn their prints out in the best possible manner.

The following week would be a sociable meeting, and where all the members were interested in the same pursuit, no difficulty would occur as to their finding subjects in common, &c.

A committee to be formed, first of all, to arrange the rules, &c. &c. Members to be ballotted for afterwards, and according to the numbers of those wishing to join the Club, so arrangements could be made for a place to receive them. Subscription, say 20s. per annum, would most likely cover all expenses.

If you think this sort of Club would not answer, please place my paper in your waste-paper basket. I remain, yours very truly, M. W., Jun.

Lavender Hill, Wandsworth, March 16th, 1864.

Dear Sir,—As the Photographic Exchange Club is about to be re-formed, may I be allowed to suggest that professional photographers be allowed to join. I cannot see in what way it would be detrimental to amateurs, and I am of opinion it would conduce very much to the success of the club. I joined it when first formed, and made several exchanges, and in every instance a further exchange was solicited; but I withdrew my name on seeing that it was objectionable for professional photographers to be members of the club.—I am sir, your obedient servant,

Hertford, March 14, 1864. A. Elsden.

[We see no reason whatever why professional photographers should not exchange. We hope they will.—Ed.]

Non-Coincidence of Chemical and Visual Foci.

Dear Sir,—In a recent impression (March 4th) in answer to a correspondent signed "W. V. A.," you have given instruction for a proper adjustment of the ground-glass and sensitive plate, to meet the want of coincidence in the visual and chemical focus of the lens.

In justice to "W. V. A.," he should have been informed that the remedy proposed will only apply in taking a portrait or picture, at a certain fixed distance from the lens; that is to say, that if the necessary adjustment be made to meet the case in taking a portrait six feet distant from the lens, a different adjustment will be required in taking a portrait twelve feet distant from the lens; for it must be evident that if there exist the slightest divergence in the visual and chemical rays on leaving the lens, the farther they travel the wider will they be apart, consequently the remedy suggested will be required to be made at every distance the lens is placed from the sitter or picture to be copied. John Blake.

Devonport.

[Our correspondent is correct. Our remarks referred to the use of a lens of not very long focus, for portraiture, in which case the variation would be scarcely perceptible.—Ed.]

Talk in the Studio.

Duc de Luynes' Prize.—All pictures intended to compete for the prize offered by the Duc de Luynes should be sent in before the 1st of April next, when the competition closes.

Hawking Photographs.—A correspondent says:—Your correspondent "Laud" may avoid the penalty enforced against hawking by taking orders from samples, and afterwards sending them from his place of residence; but if he sells goods from door to door, he is a hawker, and must have a licence. I add also a caution to those whom it may concern, that no still or retort of what size soever can now be used without having a licence.

Time and Photography.—Sun pictures may be taken in various modes—some requiring several minutes and others only an instant. Photographs of rapidly moving objects, as race-horses, the waves of the sea, &c., are taken in the hundredth part of a second. In English experiments, an image was taken in the ten-thousandth part of a second; and a rapidly revolving wheel was taken in so brief a space that it seemed perfectly well defined and stationary, being illuminated by a single discharge of an electric battery, occupying, according to Wheatstone, only the millionth part of a second.

Lecture on Photography.—An interesting lecture on photography was delivered at the rooms of the Society for the Encouragement of the Fine Arts, in Conduit Street, by the Rev. Wm. Bashall, on the evening of Thursday, the 17th inst. After a brief historical sketch, the lecturer described the processes in use, dealing humorously with some of the troubles of photography and the difficulties of portraiture, both for sitter and operator. He exhibited some apparatus by Mr. Dallmeyer, urging upon intending photographers the maxim that the best was the cheapest, and concluded by a high eulogium upon photography as a delightful recreation and pleasant pursuit for the amateur of leisure. An animated and humorous discussion followed, in which Mr. J. A. Herand, Mr. Henry Ottley, Mr. Wharton Simpson, and some other gentlemen took part.

Nitrate of Soda.—A correspondent says that he has used a weak silver bath with nitrate of soda for three months without a failure. He thinks that the gentleman who contributed the idea to our pages ought to have a testimonial.

Fading of Photographs.—A correspondent says:—"For the sake of experiment, I exposed for six months to daylight (without sun) a sheet of writing paper, one half covered, and at the end of that period found the exposed portion quite as yellow as a very badly faded photograph. Does this not prove that however well a photograph on paper may be fixed and washed, it may still turn yellow in the light?" There is little doubt that ordinary prints become discoloured and dingy in time, quite apart from fading; a fact sometimes lost sight of.

To Correspondents.

Constant Reader, M. W.—If you obtained sufficient vigour without intensification, by using a certain developer at one time, and now fail to do so, it probably arises from the use of a different sample of collodion, giving less intensity. Want of intensity may arise from the collodion in a variety of ways. Other things being equal, a collodion containing a large quantity of pyroxyline will give more intensity than one containing very little. Some samples of pyroxyline have more tendency to produce density than others; excess of bromide will sometimes cause want of density. The use of a cadmium iodizer will sometimes produce the same result, especially in a new collodion. It is possible that changing your collodion may remove your difficulties. Sometimes the same materials, which will give sufficient intensity in one state of temperature and light, will fail to do so in other circumstances. The use of a weak developer, with a full share of acetic acid, sometimes tends to secure sufficient density, when, by the use of a stronger developer, it is difficult to secure.

A Novice.—It is impossible to secure good definition for standing card portraits, and at the same time moderately rapid working, with a lens requiring only 9 or 10 feet between the lens and the model. That standing second on your list will probably answer best, but you must be content to use a moderately small stop to secure satisfactory definition all over the picture. The same dealer will make such a camera as you require.

J. R.—Your photograph is very good; but for the white sky it would have been perfect.

Cassandra.—We have never met with such a case, nor can we suggest the cause. You should communicate with the manufacturer. If the hyposulphite solution be new, it will not require the addition of carbonate of soda; but if it be old, and there is any fear of its being acid, then the carbonate of soda will be useful, as you suggest.

D. Smith.—Simple white paint is as good as anything you can use for painting such panes as you desire to be opaque. If you wish them to be merely semi-opaque, a solution of Epsom salts applied gives a pretty effect.

J. P. Ginson.—Stamps for Goddard Fund received, and shall be duly acknowledged. The lighting of your model appears to be very good. For Exchange Club arrangements see article in our number for the week before last.

X. M. D.—We certainly never dreamed that our correspondent desired the publication of his lengthy remarks upon a subject of such little importance. Had we so understood him, however, we should not have felt justified in devoting our space to such a question, for many reasons besides its limited interest. We never permit discussions on the excellencies or defects of any one's productions to appear in our columns: if we permitted eulogium in which we did not coincide, we should be bound equally to give insertion to damnatory opinion or evidence—a course very repugnant to our feelings. Whilst we are enabled to assist our readers by speaking freely in praise or blame of processes, or methods, or principles in the abstract, when we refer to the productions of individuals, we are happily exempt from the necessity of condemning anything, unless our opinion is especially challenged. We may praise that we approve without injuring any one; we must be silent where we cannot praise, if we would avoid injuring individuals. Our correspondent's error is in forgetting that we must be guided absolutely by our own judgment, rather than by his.

The Rev. E. W. V.—Mr. Sproat's address is, Mr. Sproat, photogrnpher, Windermere. We do not know of any agent for his stereographs, nor do we know the price.

Omega.—No. 1, 3, and 4 are all pretty good. Something will depend upon the length of your room. No. 1 in your list will require about 13 feet between camera and sitter, No. 3 will require 19 or 20 feet, and No. 4 about 16 feet.

J. J. L.—As a rule you will obtain much better albumenized paper by purchasing than by preparing it yourself. There is not, however, any especial secret in the process, success rather depends upon experience. To obtain a high surface use albumen without any water whatever. A small proportion of salt will give greater vigour and less sensitiveness, a larger proportion *vice versâ*. From 5 to 10 grains will give good results. There is much difference of opinion as to the best salt. Chloride of barium has warm advocates; chloride of ammonium is most commonly used. The room should be at a temperature of from 70° to 90° Fah. 2. Printing by development has not generally been successful on albumenized paper. The prints recently exhibited nt the South London Society were the best developed prints on albumenized paper which we have seen.

F. M.—Dilute your collodion with a mixture of ether and alcohol in equal parts. As it has simply become thick by the evaporation of its solvents, you will not need to add any more iodide.

M. L. F.—Use a little black lead to make the shutter slide easily; oil is not suitable. 2. The spots in the prints you send are, doubtless, from free nitrate having been splashed upon the negative by the jerking movement of the shutters. 3. We have not tried the lens you name.

Δ —See the nrticle on the subject in our last. We shall have pleasure in publishing nny nddditional facts or experience on the subject, on whichever side of the questiou they bear; but we have not space for the mere discussion of opinions.

G. F. T.—If your pyroxyline have a tendency to give a thick, glutinous collodion, use more ether, nnd avoid cadmium, which will make the glutinosity still more unmanageable. A sample of cotton, which will not dissolve at the rnte of at least four grains to the ounce of solvents, will rarely give a good negative collodion. We have no objection to methylated solvents, our experience not confirming the various allegations ns to their injurious effect.

Lex.—We must decline your letter, with thanks. Whilst we agree with your opinions, we think, on second thoughts, you will agree with us, that nothing is gained by the use of personalities, still less by the use of n slangy style, which, whilst it may "make the unskilful laugh, cannot but make the judicious grieve." It is not worth while to notice, much less resent, the coarseness to which you refer. It gives us very little concern indeed. We thauk you, however, for the intention.

W. B.—Thanks for the charming prints. The tone is admirable. We are glad our advice met the case.

F. M. T.—You have made an error in weighing. You purchased your five ounces of nitrate by avoirdupois weight, and have weighed it out by troy weight. It follows necessarily that it would run short, as in the latter ounce there are 480 grains, and in the former only 437½ grains.

R. B. A.—There is probably some fault in your gun cotton, or it would have dissolved in the mixture of ether and alcohol in a few minutes. If, as you state, it had not dissolved in the least, it is probably not guu cotton at all, and by some mistake you have used ordinary cotton.

Several correspondents in our next.

THE GODDARD TESTIMONIAL FUND.

	£	s.	d.
Subscriptions already acknowledged	351	8	8
Geo. Moir, Esq., Edinburgh	1	1	0
Messrs. G. and J. Hall, Wakefield	0	10	0
M. Stodart, Esq.	0	10	0
John Simpson, Esq.	0	2	6
Jas. Rae, Esq., Dumfries	0	5	0
A. Macnair, Esq., Edinburgh	2	2	0
F. H.	0	2	6
— Thompson, Esq, Norwich	0	5	0
— Mann, Esq., Norwich	0	2	6
Anonymous, Norwich	0	2	6
J. P. Gibson, Esq., Hexham	0	5	0
J. E., Newtownard, Belfast	0	2	6
	£356	19	2

Photographs Registered during the Past Week.

Mr. F. S Moore, Castle Cnry,
Photograph—Rev. Canon Meade.

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth,
Photograph of Dr. Corey.
Photograph—Group of the Clergy of Great Yarmouth.

Mr. Robert Atherton, 12, St. Ann's Street, Manchester,
Photograph from Oil Picture, entitled "Historical Picture the Roman Catholic Bishop of Salford.

Messrs. Webber and Blizard, Taunton,
Two Photographs of Rev. G. A. Denison.

Mr. John Thew, 7, Railway Terrnce, North Shields,
Two Photographs of Willinm Shakespeare.
One ditto of the late Fenwick Aynsley, Esq.

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 291.—*April* 1, 1864.

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THE MAGNESIUM LIGHT.

We can congratulate photographers at length on the possession of an artificial light, highly actinic and efficient, easy to use, innocuous in use, and, at the same time, inexpensive. We have from time to time called the attention of our readers to the efficiency of this light, and its richness in actinic rays, and also to the various steps in progress for cheapening its production. As we recently stated, our repeated comments on its actinic character have been followed by actual photographic application, and we are now glad to add that the metal will reach the hands of photographers at a price so comparatively low, as to permit its use for a variety of special purposes without hesitation. Various methods of preparing the metal have been proposed, and the chief difficulties in the way of a moderately plentiful and cheap supply have been the great preliminary cost, and the possible small demand for this article. When Mr. Sonstadt's patent for preparing the metal was secured some twelve months ago, some disappointment was felt by scientific men, at the apparent want of novelty in the method claimed, one of the chief differences consisting in the use of a platinum crucible. We are not now concerned to enter into the vexed question of patent right, but rather to record the facts as they stand, and how far photographers will be benefited by them. Mr. Sonstadt, has steadily worked at his patent undeterred by the heavy preliminary expenses, and has faith in his platinum crucible; a few days ago we examined one weighing over two hundred ounces, costing upwards of three hundred pounds sterling, which had just been made for carrying out this process; and it is to his operations, photographers will be first indebted for magnesium wire at a cheap rate.

The price at which it will now reach the hands of photographers, retail, is three-pence per foot, for a wire about 1-16th of an inch diameter, which will burn, emitting an exceedingly brilliant and actinic light, from half a minute to a minute A month ago, the same wire would have cost the photographer half a crown. Increased consumption will probably very much decrease even the present low price. It is used as we have often described, just in the same manner as a taper, requiring no especial apparatus, no pure oxygen, or other appliance than is required by a candle. When it is required to burn steadily for any length of time, a simple and inexpensive holder is required, to hold a reel of it with a contrivance to unwind it, and push it horizontally through an aperture, and such holders will, we believe, be supplied by Johnson and Matthey, who are Sonstadt's agents for the metal. We described, a week or two ago, various methods of increasing the volume of light, by igniting simultaneously a number of wires suitably arranged. We may now refer to another method, which has been found efficient in practice, by which two important ends are secured at one time, namely, increased volume of light, and less rapidity of combustion. By forming a rope of several strands of the wire twisted together, a steady slow combustion is secured, emitting a very perfect volume of light, the extent of which, and the ratio of combustion, can be regulated by the thickness of the rope.

It is unnecessary to enter here into the various photographic uses to which it may be applied. It may be used for night portraiture, as has been already demonstrated, although that is probably the least important of its applications. It may be used for interiors of churches, &c., where the painted windows only admit the "dim religious light," which is quite unsuited to the purposes of the photographer. It may be used for giving an actinic light to tunnels and caves, the picturing of which by photography has been hitherto a thing undreamed of. It may be used for printing, copying, and enlarging. Mr. Sydney Smyth, has already succeeded in applying it successfully to the solar camera, and proposes demonstrating its value by producing an enlarged picture by its aid, before an early meeting of the Photographic Society of London. In short, from its extremely actinic character, its simplicity of application, its freedom from any noxious fumes in combustion, and its promised cheapness, it will probably supersede all other artificial lights hitherto used in photography, and will exceed the sphere of photography in some directions in which its application has been before impossible.

NITRATE OF SODA IN THE PRINTING BATH.

If any single experiment, or single series of experiments, could settle the question as to the value of nitrate of soda in the printing bath, Mr. Dawson's results, exhibited at the last meeting of the North London Photographic Society, would unquestionably tend, at first sight, to induce a conviction that, so far from any advantage being gained by the use of the salt in question, its presence was absolutely injurious. A series of prints was exhibited upon paper floated on solutions containing from five grains to thirty grains of nitrate of silver alone, and on similar solutions, with the addition of seventy grains of nitrate of soda. The prints were arranged in pairs, a piece of paper with nitrate of soda, and a piece without, having been printed under the two halves of the same stereoscopic negative. In all respects, except the use of the nitrate of soda for one-half and none for the other, the conditions were the same. The same paper was used, it was floated for the same length of time, the exposure was the same, and so on in other respects. The results, in all instances, appeared in favour of the silver solution without the addition of nitrate of soda, those with the latter appearing to be weaker, lighter, poorer prints.

Without dwelling on the fact, that a series of experiments undertaken with a confessed foregone conclusion against the use of nitrate of soda is not so valuable as it might have been if no such bias had existed, we may suggest that the

apparently fair and impartial mode of conducting the operations really largely defeats the object of the experiments. The scrupulous preservation of equality of conditions is most deceptive and specious, for the simple reason that equality of conditions may not be required to obtain the best results from each bath. For instance, Mr. Dawson stated that in some other experiments, with the same agents, he discovered that the process of exciting was more rapidly effected when no nitrate of soda was present. Granting this to be the case, it follows that prints produced with nitrate of soda floated the same time as with those produced with a solution of silver alone, are not fairly comparable, because the conditions were suited to the latter, and not to the former.

There are some other points in which, we think, Mr. Dawson's experiments were not conclusive in themselves, but our object is not so much now to descredit these experiments, as to refer to the fact that where results vary, and experience is antagonistic—a question which has excited general interest cannot be settled by one series of experiments, or even repeated experiments of one individual. We have received from week to week communications distinctly affirming the advantage of nitrate of soda, with specimens illustrating the affirmations. Many of these communications are incidentally made in letters on other subjects, and are from professional photographers who have no desire to have their names introduced into the controversy on the subject, who can have no purpose to serve by misstatements. We have within the last week or two received such communications from two gentlemen, whose names are well known to photographers —we refer to Mr. V. Blanchard and to Mr. S. Fry. Mr. Blanchard, who has long been an advocate of weak baths, recently, for experiment, reducing the nitrate of silver solution to a strength of 20 grains to the ounce. The prints obtained were very good, but it was observed that the bath began to discolour, indicating the solution of a small quantity of the albumen from the paper. After being decolourized, and again made the same strength of 20 grains, excess of nitrate of soda was added. The prints now were excellent, and *there was no discolouration of the solution*, indicating satisfactorily to Mr. Blanchard's mind that the albumen which was before slightly dissolved now remained intact, and that the nitrate of soda unquestionably exercised a beneficial influence. Mr. Fry's attention was called to the matter in an unexpected manner. He was called upon one day by his printer to give an opinion as to which was the best of two lots of prints from the same negative. Having given an unhesitating verdict, his printer informed him that he had been trying nitrate of soda; that the two lots were from a 25-grain silver solution alone, and from a similar solution plus nitrate of soda; and that the prints which were so manifestly superior to the others were produced by the aid of nitrate of soda.

Now, without wishing to give an undue preponderance of weight to the experience of professional photographers, or the results arising out of the commercial practice, as compared with those of a more *dilettante* character obtained by what Professor Hoffman once derisively called "writing-desk experiments," we submit that the subject is one which must be decided by the preponderance of well-ascertained facts; not by exceptional experiments, still less by ridicule or offensive epithet.

A NEW LITHOGRAPHIC PROCESS.

M. Toovey, of Brussels, of whose very fine prints, by Asser's process, of which he is the proprietor, we had some time ago to speak in high terms, has recently patented another process of photolithography, based upon the transfer principle, but essentially different in the mode of operation from the methods of Asser, or Osborne, or James, or Pouncy. In each of these, as our readers know, the object is to produce a photographic image in greasy ink on paper, and then transfer this image by the method generally used by lithographers on to the stone or zinc. In M. Toovey's new method he proceeds after an entirely different fashion. Using the agent the properties of which is the basis of almost every permanent printing process—bichromate of potash—he mixes this with gum arabic, and exposes paper prepared with it, under a negative, to light. Instead, now, of inking this as in the other processes, he lays it, face downwards, on the lithographic stone; upon the back of the paper he lays sheets of damp paper, and subjects the whole to pressure. The moisture is thus made to permeate the sheet of paper containing the image, softening those portions of the gum which had not been rendered insoluble by the action of light on the chromic salt it contained. The gum thus softened leaves the paper and adheres to the stone, forming there an image, the lights of which are gum and the shadows bare stone. The surface being then inked with a roller, receives the greasy ink in the shadows, and is protected in the lights by the gum, which is next removed; and the stone having received an image which has the peculiarity of requiring no etching, is treated, *secundum artem*, by the lithographer.

It will be perceived that this is a very ingenious and simple method of transferring the image to stone, the plan of protecting the lights and then inking the bare stone having some analogy to the method of Cutting and Bradford, patented some years ago, but securing the end in a much less clumsy manner. How far the process is successful at present remains to be proved, and also if it possess any better facilities for the production of half-tone than has been hitherto secured. In this respect, we cannot see any *primâ facie* reason to anticipate better results than have been already obtained. We shall look with interest for some examples of the working of the process.

The patent, which was sealed in December last, is numbered 1,588. It claims the invention of "Improvements in Photolithography, Photozincography, and Photographic Engraving on Copper or Steel Plates, or on other Suitable Substances." The specification runs as follows:—

In order to produce on a lithographic stone an impression suitable to be printed from, I proceed as follows:—From a negative on glass or paper a positive impression is taken on paper prepared in the following way:—I take sized paper very smooth and even in texture, which I coat with a solution of gum arabic in pure water, saturated with bichromate of potass; it is known that bichromate of potass in combination with an organic substance, such as gum, gelatine, and starch, becomes insoluble in water after a certain exposure to light. The paper prepared as above I then expose to light behind a negative, and when the photographic image is sufficiently developed, such parts of the gum impregnated with bichromate of potass which receive the rays of light become insoluble, or partly so, exactly according to the gradation of tone in the negative employed. The sheet of prepared paper with the photographic image thus printed I place face downwards on a lithographic stone, grained very fine or polished, according to the nature of the image to be reproduced, and previously arranged in a percussion press (it can be done in the lithographic press, but the result is uncertain). I then place several sheets of damped paper upon the stone over the photographic proof and apply a heavy pressure; the water contained in the damp paper is pressed through the photographic proof and dissolves the parts of gum remaining at liberty; the dissolved gum attaches itself to the surface of the stone. When the stone has remained a certain length of time in the press, sufficient to allow the small quantity of soluble gum in the dark shadows to attach itself to the surface of the stone, I remove the pressure and withdraw the photographic proof carefully from the stone; a negative image is then visible in gum on the stone, with all the gradations of tone. I then dry the stone, either spontaneously or by gently warming it; when well dried I cover the whole surface of the stone with greasy ink, which may be applied with a roller or otherwise; the greasy ink is thus brought into contact with all the parts of the stone untouched by gum; the coating of ink is then removed by passing through the lithographic press, by spirits

of turpentine, or otherwise, and all the gum removed from the surface by washing. The stone is then rolled in with ordinary printing ink, and the positive image appears in black; it is then printed as every lithographic drawing, but has the great peculiarity of requiring no etching, the gum having so far penetrated by pressure into the substance of the stone as to allow of a great number of impressions being taken off. I prefer gum arabic, but similar substances can be used instead, such as gelatine, dextrine, and mucilaginous solutions.

In photozincography I proceed as above described, substituting a zinc plate for a lithographic stone.

In photographic engraving on copper, steel, or other metal plates, the preliminary operations are the same as those I employ for stone or zinc, excepting that a positive image on glass or paper should in the first instance be used instead of a negative. When the plate is withdrawn from the press, and the photographic proof detached from it, it should be well dried, as I have said for the stone. The plate is then covered with a thin coating of varnish, and when dry may be soaked in water to remove the gum, or immediately plunged in a weak solution of acid, and etched in the usual way of etching on steel or copper; wherever the plate is protected from the varnish by the gum it will be attacked by the acid, and an engraving is produced, which is then printed as an ordinary etching on metal plate.

AN IRON DEVELOPER AND INTENSIFIER.

The Rev. Wm. Law, in a recent letter, gives us the details of an iron developing solution which usually gives sufficient intensity with one application, and permits the addition of nitrate of silver solution without decomposition, if a second application be necessary to secure sufficient printing density. He says:—

I have just been using some developing solution which I made the end of the last summer, and which answers for negatives without any *intensifying* just as well as when first made.

It is an excellent thing:—

25 grains of the *compound* crystals of sulphate of ammonia, and sulphate of iron.
25 grains sugar of milk.
20 grains glacial acetic acid.
5 grains citric acid.
1 ounce distilled water.

I have never seen this published, but I prefer it to any other kind. It will bear the addition of nitrate of silver solution without decomposition, just as well and as long as common pyrogallic developer.

RESEARCHES ON DRY COLLODION.

BY M. VERNIER, JUN.

Under this title we published some two years ago an article, which critically examined and condemned all the preservative coatings applied to dry collodion, and in which we also protested against the extravagant washing of the sensitive film, because we were convinced by previous experiments, that the iodide of silver entirely freed from nitrate of silver, was insensitive to light. The researches we have since made on this subject have confirmed our views and rendered striking justice to our remarks.

Since that date, dry collodion has made decided progress, without, however, attaining the desired aim; but, among the processes which have been published up to the present day, there is one, especially, which has produced a real revolution among photographers who are in search of a dry collodion process. The labours which have been pursued without relaxation in this new direction, have borne their fruit, thus light gives place to darkness, in this laybrinth of obstacles which oppose themselves to the solution of this very difficult problem; for already Major Russell's process has engendered a host of methods which we hope, will not be long in fulfilling the conditions of the programme traced by the Photographic Society of Marseilles. Honour, then, to Major Russell, who has found in a reagent of silver the foundation stone of dry collodion.

Of all the methods which have been published since our last article, and which emanate from the tannin process, we have experimented upon three, which we proceed to give an account of, because they differ from each other in certain respects, and are published by eminent operators who have distinguished themselves since the début of photography by publications of the highest interest. These methods originated with MM. Blanquart Evrard, Brebisson, and Poitevin. We are reminded that M. Blanquart is the author of a complete work upon the paper process. Although published so long ago as 1851, this work has lost none of its value, it will always be read and appreciated by good photographers, because they will find excellent instructions in it.

M. de Brebisson is the first who, in France, introduced photogenic collodion in a convenient form. The rapidity of this new substance, together with the facility of working it, has caused it to be adopted by all photographers, in preference to previous processes.

Lastly, M. Poitevin, the inventor of the gelatine process, the carbon process, and various heliographic formulæ, is too well known to our readers for it to be necessary that we should sound his praises. These eminent experimentalists are the promoters of good photographic processes; they are those who, in some measure, have marked the ascending scale of the various phases in which photography has progressed since the discovery of the daguerreotype.

We now proceed to examine M. Brebisson's method, composed of various formulæ, which have yielded good results; but we shall speak only of the most rapid formula, because it alone approaches the aim sought to be obtained in dry collodion. M. Brebisson has fully understood that this rapidity could be arrived at only by keeping the collodion in a state of humidity. In this lies, in fact, the sole means of arriving at instantaneous pictures, but it is to be regretted that M. de Brebisson employs honey mixed with tannin to overcome this difficulty. The honey forms one of the sticky coatings, of which we are the avowed enemy, because they require, after exposure, an excessive washing, which disorganizes the molecules of collodion, and removes, in some measure, the vehicle of the developer, or attractive epidermis of the sensitive film. From this state of things there results an infinity of spots or marblings, which the most skilful of photographers find it difficult to avoid. This process can only be practised by very skilful hands, those of M. de Brebisson, for instance.

Why cannot we replace this sticky substance by another, which does not possess this serious objection? Does not chemistry, which presents us so many resources, possess a deliquescent substance inert upon iodide of silver, of which the sole property will be to attract humidity from the air to the sensitive compounds, without disturbing the final operations of development? I appeal, on this subject, to MM. Poitevin, Monckhoven, Barreswil, and Davanne, for there can be no doubt that if this product were discovered, dry collodion would soon attain to perfection.

Let us now proceed to M. Blanquart. We are compelled to avow that, on this occasion, he has not responded to our expectations. His intelligent article has greatly interested us, but his dry collodion method teaches us nothing new. M. Blanquart acidulates his baths, which we had already recommended in our preceding article. He replaces tannin by another reagent, a thing which was not difficult to do, as all the reagents of silver have nearly the same property as tannin. Lastly, he believes that the free nitrate of silver is the sole obstacle to the success of dry collodion. This, in our opinion, is a serious error, for we repeat that iodide of silver, entirely deprived of free silver, is wholly insensible to light. To prove this fact, it is only necessary to employ the two following formulæ.

Sensitize a plate, immerse it afterwards in a dish of water previously prepared by the addition of acetic acid and some drops of nitrate of silver, concentrated solution, in order to precipitate the calcareous or nitrous salts, which most natural waters contain; agitate the plate in it for a few moments, to cause the greasiness to disappear, and to remove the too great excess of free nitrate of silver, which may cause fogging. Remove the plate from the washing bath, expose and develop it. A picture is obtained because there remains sufficient free silver upon the compound substance for the light to produce its effect.

Second operation: immerse the plate in water after removing it from the silver bath, allowing it to remain in it a few moments, then wash it copiously under a tap of water, and pro-

proceed to expose and develop it. We obtain nothing—*absolutely nothing*.

What can we conclude from these two experiments except that iodide of silver, chemically pure, that is to say, isolated from every kind of simple body, is insensitive to light and that we think to destroy the free silver by the reagent. But then, why wash the plate before interposing the reducing agent? Is it not with the intention of removing every trace of free silver? But no, that is not the part played by the reagent substituted for the free nitrate of silver in the dry collodion process. The sole fact that characterizes M. Blanquart's method is the washing of the plate before exposure, after applying the developer. The idea is excellent, but it does not respond to the final result of the process. We have remarked that the development was extremely slow, and difficult to manage, and that, upon attempting to obtain vigour, the picture becomes hard, deficient in detail and harmony in the shades; such, in fact, is the result we obtained in trying this method. Besides, the sulphate of iron is a fixing agent, it contracts the collodion instead of opening its pores, and in that way renders it inaccessible to the chemical action of light.

We now arrive at M. Poitevin, who has been most happy in his researches, for his method, or rather his discovery, is one of the most interesting. M. Poitevin is one of the great captains of photography, who cultivates his art of chemical engineer with ardour to enrich photography every year with new discoveries. Let us also say that M. Poitevin is an indefatigable searcher, who passes his days and nights in company with his vials ranged in battle array around the walls of his laboratory, so that when he enters upon a new path he pursues it, studies it, works at it with the perseverance and obstinacy of a man who is sure of his way, and he does not halt or stop in his course until he has smoothed all difficulties and overcome all obstacles. So that to him our photographic operations are mere pastime. He manœuvres his products with the tact and skill of a general who, in a campaign, manœuvres his troops upon the battle field. In his recent communication he proves to us that a reagent of silver is a sensitizer of iodide of silver. This is evidently the part which is filled by the reagent substituted for the free nitrate of silver in the dry collodion process. In our opinion, however, M. Poitevin has advanced too far in qualifying the reaction of the sensitizer, for the free silver employed, either before or after exposure, will always be, until fresh orders, the vehicle of the iodido of silver in our present processes; the reagent only modifies it. This modification, probably, operates in the following manner:—

The free nitrate of silver is transformed by the oxydation of the reagent into extremely divided particles of metallic silver, which, by contact with free iodine, which is liberated either before or during exposure, forms the vehicle of the iodide of silver already modified by the reagent to the degree of acquiring the sensitive qualities of the daguerrean plate, the silver compound of which rests upon a metallic surface. These considerations upon the theory of the action of light which we put forth in this place as an hypothesis, have suggested to us the idea of a new method, which consists in introducing into the collodion a certain quantity of tannin, in order to facilitate the complete oxydation of the coating of oxide of silver, which, in the methods employed up to the present day, acts only upon the surface of the collodion. We can affirm that this method, reduced to its simplest expression by a *special washing*, the object of which is to destroy the tannin and soften the sensitive coating without injuring the vital principle of the process, leaves nothing to desire under all these relations.

We shall have the pleasure of communicating it to our readers at the end of this article, and beg them to give us a few moments' further consideration, for the interesting discovery of M. Poitevin naturally leads us to a question of the highest importance for the future of photography, namely, what is the nature of the action of light upon our sensitive products. The researches which have been made with this aim have taught us nothing positive in this respect, therefore this mysterious action of light, which constitutes, as it were, the galvanic pile of photography, still remains in the obscurity of the chemical laboratory. Will it be more difficult to clear up than the solar spectrum, which MM. Bunsen and Kirchoff have succeeded in analysing, at a distance of 34,000,000 leagues? In fact, to explain that attraction of the molecules of silver which tends to take place in preference upon the parts acted upon by light when we develop the picture. May there not be some electric cause at work of which we are ignorant, and which has eluded the sagacity of our most eminent chemists? Generally it has been supposed to be a decomposition; then, in consequence of numerous analyses, it has been termed a *modification*, a vague and indefinite expression, which signifies nothing, determines nothing. Let us add, that this modification is a disposition to reduction, and that the action of the light will be better explained. This is, at least, what we hope to be able to prove as the result of our operation. We shall give this simplified process in our next.

(To be continued.)

NITRATE OF SILVER BATH.*

There are but very few things that produce so much difficulty to the photographer as the nitrate of silver bath. This arises in a great measure from two causes: the materials used in the preparation, and the indefinite knowledge we have of the impurities subsequently introduced, and of the best mode by which they are to be removed. There is no doubt whatever of one fact, that if the nitrate of silver and water be quite pure, the resulting bath, when properly prepared, will yield irreproachable results. The questions that arise are simply, in the first place: What is the best formula for preparing the nitrate of silver bath for positives, as also for negatives? Or, will one and the same bath do for both?

The picture in glass positives or ambrotypes, melainotypes, &c., is a surface picture, and is required to be as white and bright as possible in the lights; whereas the picture in the negative penetrates the film and is formed in the substance of the collodion, and is required to be dark-coloured and opaque in the shades. The requirements in the two pictures are evidently different; and if variations in the silver bath can fulfil these different requirements, it is for us to find out the modifications that will produce the required results.

As already remarked, the nitrate of silver must be pure, and so must the water. The former, in commerce, is not always reliable; it contains frequently free acids and nitrates of other bases. It can be obtained pure by dissolving *pure* silver in *pure* nitric acid, then by evaporation to dryness, re-solution, and crystallization. The crystals, after drying, are again dissolved in the minimum quantity of pure water, and again crystallized. Such salt is denominated re-crystallized nitrate of silver, and is the salt which is to be used in the preparation of the silver bath.

Water is obtained sufficiently pure by catching rain water in a clean vessel, or by distillation. Such water alone is proper for the purpose in question. But even here the vessels—that is, the still and the receiver—must be quite clean. It would not be proper to use water as it distills from a steam-boiler for the preparation of the silver bath.

The next thing is to prepare *pure oxide* of silver, by which the bath can be neutralized in case it should show any acid reaction even with recrystallized nitrate of silver.

Make, therefore, a solution of one drachm of nitrate of silver in two or three ounces of water, and add to it a solution of pure caustic potassa as long as any precipitate is produced. Now pour the dark-coloured mixture upon a filter. Test the filtrate with the potash solution to see if it contains still any silver, by dropping into it a drop or two. If no precipitate results from this treatment, all the silver has been precipitated in the form of oxide.

Now this oxide must be thoroughly washed by stirring it with a feather and filtering pure water through it. This operation has to be repeated a great many times, until the filtrate no longer acts upon yellow turmeric paper so as to turn it brown. It is then carefully removed from the filter, and preserved in the *moist* condition in well closed vials.

The next operation is to obtain, in like manner, *moist* iodide of silver. Dissolve 30 grains of nitrate of silver in pure water; to this solution add a solution of iodide of

* From *Humphrey's Journal*.

potassium as long as a yellow precipitate is formed, and filter the mixture. Test the filtrate for the presence of silver by dropping in solution of iodide of potassium, and filter again if any iodide of silver is thus formed. Stir the precipitate about with a clean feather on the filter, and wash it thoroughly with continually fresh additions of water. After the iodide is thus obtained in a pure state, preserve it moist in stoppered vials for future use.

The materials are now ready for the preparation of the silver bath.

Towler's Formula for the Normal Silver Bath.

Recrystallized nitrate of silver ...	2 ounces.
Distilled water	24 „
Oxide of silver	4 grains.
Iodide of silver	4 „

Boil the whole in a clean glass retort for a quarter of an hour, and then set aside to cool. When cold, decant the clear supernatant liquid from the sediment, if any remain, and preserve it in the stoppered stock-bottle for future use. The sediment can be used over again in the next bath, or thrown away among the other silver residues for reduction.

A bath so prepared will be neutralized and iodized at the same time; it will contain no extraneous ingredients; it is just what is wanted, and ought to be prepared in this way by the photographic chemist for the use of photographers. It is not *yet* ready for use, however; it is merely a *plain* or *normal* silver bath. We will manufacture two new words: it has to be *positized* or *negatized*, as the case may be.

Positized Nitrate of Silver Bath, or the Nitrate of Silver Bath for Glass Positives, Melainotypes, &c.

Formula.

Plain neutralized and iodized silver solution	12 ounces.
Nitric acid	2 drops.

Add, but very cautiously, more nitric acid, if the lights of the picture do not come out white, and the shades remain perfectly bright and transparent.

Negatized Nitrate of Silver Bath, or the Nitrate of Silver Bath for Negatives.

Formula.

Plain neutralized and iodized silver solution	12 ounces.
Acetate of silver	3 grains.
Glacial acetic acid	6 drops.

Acetate of silver is formed by adding a solution of acetate of soda to one of nitrate of silver; a crystalline precipitate is formed which is separated by filtration, dried and preserved for use. This salt is partially soluble in the silver solution, and communicates intensity to the shades of the negative; it renders the film also more sensitive, and thus shortens the exposure.

We will here add, in order to complete the article, that the bath ought to be filtered over night in order to be in readiness the next morning.

The vessel, too, which contains the silver solution must be thoroughly cleaned from any adhering particles of iodide of silver or other sediment, by pouring into it an abundance of rain water, and brushing the sides and bottom with one of those long brushes which are used for cleaning out test-tubes. Or a piece of sponge attached to a long thin slip of wood may be used for this purpose. As soon as the vessel is thus quite clean, pour in fresh water, shake it about, and then invert the vessel and allow it to remain in this condition, reared on one corner against the side of the sink.

These precautionary measures will, in a great measure, prevent the trouble of pin-holes in the collodion, and will insure a pure picture.

The strength of the bath has to be maintained as near the original condition as possible. This can be accomplished by having on hand a stock-bottle of silver solution prepared in all respects as just prescribed, excepting that only 16 ounces of water are added to 2 ounces of recrystallized nitrate of silver.

If it happen, however, that the bath is quite out of order by long use and accumulation of ether, alcohol, aldehyde, acetic ether, &c., the best remedy is to boil the bath—and we advise every photographer to boil his bath once a week, as, for instance, every Saturday evening for at least five minutes—and, after it is cool, to filter as usual.

By this treatment the etherial, alcoholic, and all volatile solutions are driven or distilled off, and organic substances precipitated; the latter, of course, are removed by filtration. This mode is more certain in its effects than that of exposing the solution to sunlight for a day or two, and is naturally much more expeditious. Large evaporating dishes are the best vessels in which to boil the bath; these can be placed over a sand-bath that can easily be adapted to any kind of stove.

EXPERIMENTS ON THE NITRATE BATH, BLISTERING OF PRINTS.

BY WM. A. TERRY.*

I promised some time since to send you a communication on the collodion bath. Having been recently reminded of it by some of your subscribers, I will do so. I regret that the pressure of business has prevented me from repeating some experiments made a few years since, the details of which I do not recollect with sufficient accuracy to refer to them. It is well known that collodion acquires a red tint by age, and gives a thin and rotten film. Such collodion, however highly iodized it may originally have been, and although its density may have been restored by the addition of new cotton, will still give a blue and transparent film in the silver bath. What has become of the iodine? Evidently it has formed an organic compound in which the iodine plays a part analogous to the chlorine in chloroform, and cannot be detected by the usual tests; or a compound whose silver salt is, at least partially, soluble. I incline to the opinion that both these suppositions are, to some extent, true. Accepting this belief, it will be seen how iodic compounds may accumulate in a bath, which has been, notwithstanding, previously saturated with iodide of silver.

Let us see how these compounds, which must exist to some extent in all collodion, will affect the bath. I believe it is the experience of good operators, that a bath in constant use gradually loses its sensitiveness, especially to the feeble rays, and requires a longer exposure; this is due not only to the compounds derived from the collodion, but to changes which take place in the bath itself.

In a bath which has been long in use, the iodide of silver is not as quickly precipitated by dilution with water. I have frequently doubled the volume of an old bath, without causing milkiness, while a new bath is rendered turbid by the slightest addition of water. In one case of a bath which had been several times boiled and doctored, I found it capable of dissolving an incredible amount of iodide, a plate coated in it became covered with prismatic crystals resembling sand, and the solution soon became filled with them.

I had for some time suspected that boiling a solution facilitated the formation of these compounds; to decide the question, I took an old bath which worked slowly, and boiled it a long time, filling up occasionally with water; on finally evaporating it carefully, it crystallized in minute needles, of the colour of iodide, but otherwise exactly resembling the crystals of the fulminate of silver. I made a solution of these crystals of the strength of fifty grains to the ounce, and although it coated a plate well, I found it

* From the *American Journal of Photography.*

wanting in sensitiveness, ten times the usual exposure producing only a feeble and faint image. I then precipitated the silver with carbonate of soda, washed, and re-dissolved; increasing the volume so as to reduce the strength to about thirty grains to the ounce, when it performed well. In another experiment, I took the precipitated carbonate of silver, and after thorough washing, placed it in a half-gallon glass flask, and boiled it two or three hours with excess of carbonate of soda; the silver was partially reduced, forming a bright mirror surface on the glass; on cooling, the clear liquid was found to contain a large quantity of silver in solution, and which refused to precipitate, except partially, on the addition of a chloride, acting in this respect similar. It is well to remember that the fulminate of silver is formed by heating nitrate of silver with nitric acid and alcohol. It is a very unstable salt, exploding violently and dangerously when dry, from slight causes. I once narrowly escaped serious consequences from the terrific explosion of a quantity, while still moist, standing exposed to sunlight. In solution it appears to be very permanent, resisting the light with more vigour than the nitrate, it is only sparingly soluble.

I find that an old bath contains much more iodide than is necessary to prevent its action on the collodion. A quart of old bath may be increased to two or three, and sometimes to a gallon, and then strengthened with silver, without requiring any more iodide.

My conclusions from my experiments are, that the bath becomes deceased from the formation of organic compounds containing iodine and silver, and that these compounds are partially decomposed and precipitated by the alkaline carbonates, and, to some extent, also by sunlight. I intended to have troubled you with some speculations on their probable composition, but I am not in the mood for writing, and this must be my apology for the crude nature of this communication; I have only forced myself to write it now from the fear that otherwise it would never be written.

A subscriber to your journal writes me from Kentucky, enclosing prints, and requesting me to inform him and others in the south-west, through the columns of the journal, why the pictures made in that section are not equal in softness and colour to those made in the eastern cities. I think the trouble in the prints is, that the glass is too bare. I should use more iron in the developer, and perhaps more silver in the bath. It is impossible to make a first-class negative by intensifying, unless you have a good foundation to build upon; if the first development does not produce an image sharp and well defined by transmitted light, the redevelopment will make the lights exaggerated and flat, and the shading coarse and abrupt. The deposit of metallic silver which forms the image is crystalline; for soft and delicate shading it is necessary to make the crystals as minute as possible, for this reason it is best to use as much iron, and as little acid, as is consistent with even development; never push the development so far as to produce even the slightest deposit on the shadows, the glass should be bare only in the very deepest shadows.

Another correspondent relates a case of unaccountable failure to develop with reasonable exposure. Let me mention a similar case, in which the trouble was easily traced to pyroligneous impurities in the acetic acid used in the developer, which precipitated the silver before it had time to deposit on the image. Any chlorine impurities in the developer would produce even worse results. If the developer turns muddy upon the plate, "there is something rotten in Denmark."

I see a few lines in the last journal in regard to the blistering of albumen prints. Rive's paper is rather more liable to this disease than Saxe, in other respects I prefer it; whatever may be the first cause, the trouble is aggravated by an excess of alkali in the toning bath; to remedy it as far as possible, use no more alkaline salt in the toning bath than is positively necessary, tone quickly, do not fume the paper too strongly.

REPRODUCTION BY AID OF LIGHT.

BY M. A. MORVAN.

This process, which permits of the reproduction of every kind of design, engraved maps and charts, printed matter, manuscripts, and photographs, is extremely simple, easy, and prompt. The following is the method of operating:—The subject to be reproduced, whether on paper, linen, or glass, is placed with its *recto* on a lithographic stone previously coated, in a dark room, with a varnish composed of bicromate of ammonia and gelatine. (For paper, *papier Saxe* is naturally to be preferred; but any other paper sufficiently transparent will answer). This done, the stone is exposed to the action of light, from thirty seconds to two or three minutes in the sun, or from ten to five and twenty minutes if in diffused light. At the end of this short time I remove the design and wash the stone, first with soap water, then with pure water, and immediately ink it with the roller.*

The design is already fixed, for the picture begins to appear black on a white ground. Then I gum the stone and leave it a few minutes to dry and the operation is concluded.

The stone can now be put on the printing press, and as many impressions taken from it as required. If, however, a large number of impressions is required, it will be advisable before washing the stone with soap, to lightly acidulate it, no matter which acid, of 2 to 3 degrees of Baume's areometer.

It will be understood that the light fixes the varnish and renders it insoluble whenever it strikes, while, on the contrary, all the parts of the stone shaded by the picture remain insoluble, and consequently attackable by the soda and the acid, after which they retain the fatty substance of the soap.

This permits of my saying that the action produced upon the stone belongs both to engraving and to photography. As to the advantages of the process, they may be summed up as follows.—

Simplicity and rapidity of the operation.

Mathematical accuracy of the reproduction, which is a true and perfect tracing.

No necessity for *negatives* upon paper or glass; the *positive* original yields a *positive* copy.

The preservation of the original intact and immaculate.

Solidity of this litho-photo engraving, at least equal to that of engraving upon stone, properly so called.

Lastly the extreme economy of the process, on account of the low price of the substances employed.—*Communication to the Académie des Sciences.*

ON THE NATURE OF COLOURED GLASS FOR THE OPERATING ROOM.

BY DR. VAN MONCKHOVEN.

A series of recent failures has put us in the way of discovering the cause of the want of intensity in negatives, which is but little known, nor is it described in any work on photography.

It is generally admitted that it is best to lighten the operating room by interposing yellow glass between the light. Now, we have remarked, that when the external light is rather strong, it is impossible to work quickly with collodion plates, even the most sensitive. This singular contradiction is easily explained in the following manner.

It is very difficult, if not impossible, to find monochromatic yellow glass, that is to say, such as does not allow the yellow rays to pass through. Usually, yellow glass transmits orange and red rays. Moreover, in most cases this kind of glass is more red than yellow, and it is precisely in this fact that the cause of this singular failure lies. In

* This process is analogous to that patented by Messrs. Cutting and Bradford some years ago.

fact, moist iodide of silver, as it exists in the collodion film, is, so to speak, insensitive to green, yellow, and orange light, but red light has a slight action upon it. From this it results that when the sun's rays fall upon a window, or that the external light is rather strong, the collodion film is sensibly impressed. So, in order to avoid fogged proofs, photographers are in the habit of covering the yellow glass with an opaque shutter. This is supposed to be sufficient, and I thought so too, until I discovered my error.

On the 7th of February last the weather was magnificent, and I resolved to take some instantaneous views. My operating room was strongly lighted, but as the window was covered with several thicknesses of deep yellow glass, I thought I had no occasion to cover it up. I could not, however, obtain any intensity in my negatives, although my collodion and baths were in perfect condition. The pictures were slightly fogged, but the idea did not at once occur to me that it was owing to the light. Nevertheless, I concluded by completely closing the shutters, and then, singular enough, my negatives acquired their usual intensity.

In pursuing my experiments, I remarked that it was not during the sensitizing that the strong light is to be feared, although this is the general opinion, but during the development. It is proved by this fact, that a collodioned plate sensitized and exposed to the sun behind a yellow or red glass, is scarcely impressed, but during development a phenomenon takes place upon which very few theoretical notions exist, and which is as follows.

It sometimes happens that, instead of developing a negative we develop a transparent positive. Hitherto this has taken place very irregularly, but I venture to believe that it is caused by the nature of the light admitted into the operating room. We know also, that when, during development, we open the shutter so as to admit the light, the negative is gradually reversed, and passes to the condition of a transparent positive.

Now, singularly enough, it is precisely under the influence of the red light that this reversion prefers to take place, and, as we have stated above, yellow glass is rarely free from it, we find in it the cause of failure.

Very frequently, however, the conversion of a negative into a positive does not take place entirely, but partially, and then, appreciable effect is a complete want of intensity in the negative, especially in the parts of the model strongly illuminated, the sky for example.

If then it be desired to take an instantaneous photograph, it is urgent to develop by the light of a candle surrounded by yellow glass, in preference to daylight passing through yellow glass, because the candle emits rays of another kind, and much less intense than the light that passes through red glass. The experiment is easily made, and we may perceive that in the case of developing by candle-light the negative will have great intensity, while in the contrary case, it will be absolutely deficient in it, and will also tend to convert itself into a transparent positive, especially if intensified with pyrogallic acid.—*Le Moniteur de la Photographie.*

PREPARATION OF IODIDE OF CADMIUM.

BY M. VOGEL.

Iodide of cadmium may be obtained by the dry or the humid process, by digesting metallic cadmium with iodine and water. Both these processes have their inconveniences; for iodide of cadmium, submitted to the action of heat, disengages iodine, and as the fusion of the cadmium takes place only at a very elevated temperature, the preparation of iodide of cadmium, by the dry method, occasions a very considerable loss of iodine, and this method does not furnish a very uniform product.

Digesting iodine with cadmium, in presence of water, constitutes a very long operation, in which also iodine is lost by volatilization. A better method of preparation, free from these inconveniences, and which furnishes a pure product, consists in the decomposition of a cadmium salt by iodine. By the double decomposition of iodide of iron and carbonate of cadmium, we cannot obtain a salt free from iron; but by decomposing sulphate of cadmium by iodide of potassium, and taking advantage of the solubility of iodide of cadmium in alcohol, the preparation of this latter salt becomes easy.

Dissolve in a small quantity of water 20 parts of iodide of potassium and 15 parts of sulphate of cadmium; the solution, evaporated to dryness, yields a white crystalline mass, which is treated with absolute alcohol. The iodide of cadmium is dissolved, while the sulphate of potassa remains as a residue. The alcoholic solution furnishes the cadmium salt in fine crystals. By employing the quantities indicated 15 parts of crystallized iodide may be obtained.—*Polytechnisches Centralblatt.*

PREPARATION OF IODIDE OF AMMONIUM.

BY M. JACOBSEN.

To prepare iodide of ammonium for photographic purposes, saturated solutions of iodide of potassium and sulphate of ammonium are employed. The two solutions are mixed in equivalent quantities, and a quantity of alcohol added equal to 15 per cent. of the water employed for the solutions. At the end of 12 hours the greater part of the potassa is found to be eliminated from the solution in the state of sulphate.

The iodide of ammonium, being very soluble, remains in solution in the mother-waters. By the evaporation of the latter we obtain the salt of ammonium in crystals. When the liquids separated from the crystallized iodide of ammonium are reduced to one-fourth of their original volume, a fresh quantity of alcohol is added in order to precipitate the sulphate of potassa, and obtain by concentration a purer salt of ammonium. To avoid loss of iodine, it is necessary during the evaporations and crystallizations, to protect the liquids from acid emanations, or rather to add a solution of ammonium in alcohol.—*Ibid.*

Proceedings of Societies.

North London Photographic Association.

The annual meeting of this association was held on the evening of Wednesday March 23rd, in Myddelton Hall, Mr. Shadbolt in the chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were elected members of the society:—Messrs. H. Hobbs, J. G. Wickham, Maxwell, J. F. Martin, C. J. Ruck, and C. Kesterton.

A brief report of the progress of the society was read, and a balance in hand of £32 16s. 8d. announced.

Mr. Sydney Smyth exhibited some very fine solar-camera pictures of large size. These were well defined, excellent in tone, and possessed some fine artistic qualities. They received universal admiration. In answer to various questions, Mr. Smith explained that they were developed prints on Hollingsworth's drawing paper, prepared with a bromide of potassium and chloride of ammonium, 7½ grains of the former to 4½ grains of the latter in an ounce of water, applied by immersing the paper, and a 50-grain silver bath applied with a piece of canton flannel. The negatives were thin iron negatives on half-plate glasses. For a moderate amount of enlargement he used a half-plate portrait lens, but for very large pictures a whole-plate portrait lens. Mr. Smyth also exhibited a piece of magnesium wire, which he burned to illustrate the actinic character of the light, and explained that he had found it quite successful for enlargement by the solar camera.

Mr. Wharton Simpson exhibited some further specimens of Mr. Swan's carbon process, which were much admired.

The election of officers then took place. The President, Vice-President, Treasurer, and Secretary being re-elected, the following gentlemen were then elected as the committee for the ensuing year: Messrs. Wharton Simpson, J. Bockett, J. Shave, W. Hislop, W. W. King, J. Martin, E. W. Foxlee, and Mr. Geslett.

Attention having been called to the album of the Society, Mr. Fox, of Little Britain, volunteered to mount gratuitously all prints which might be presented.

Mr. Dawson then exhibited a series of specimens, illustrating some experiments he had undertaken with nitrate of soda. He had albumenized the paper himself, and had prepared a series of baths with and without nitrate of soda. In each instance, he had printed under the two halves of the same stereoscopic negative a piece of paper excited with the plain silver, and another piece with a silver bath of the same strength, but with nitrate of soda added, the prints in all respects being subjected to the same conditions. The baths consisted of 5 grains of nitrate of silver, 10 grains, 15 grains, 20 grains, and 25 grains, and the same baths with 70 grains of nitrate of soda, each being floated 2 minutes; and also one with 30 grains of silver, and 50 grains of nitrate of soda, floated one minute. In several instances, there was very little image at all; but in each case, the advantage seemed to rest with the simple silver bath. Another series were floated on a silver bath of 20 grains, and on the same bath with 40 grains of nitrate of soda. The paper was floated for various lengths of time, from 30 seconds to 2 minutes. In all instances short of 2 minutes, the paper on the bath containing soda seemed not to be fully sensitized; at 2 minutes, there did not appear to be much difference; but the tendency of nitrate of soda in all cases seemed to retard the progress of sensitizing, and render the operation slower. He was convinced that the presence of nitrate of soda in the bath was injurious; but would be glad to hear the experience of others, and to repeat any experiments which promised greater success. He thought his view of the matter would be justified by a proper consideration of physical laws, into which, however, he would not enter, as he was preparing a journal article on the subject.

Mr. Hill said, that in dealing with the question of weak baths it was too common to leave out of consideration the amount of chloride used in preparing the paper.

The Chairman said Mr. Hughes had drawn attention to that part of the subject.

Mr. Dawson had used 10 grains of chloride, but he did not think that this affected the question much, so far as the nitrate of soda was concerned.

Mr. Hill thought it would be an advantage if makers would state such particulars in selling the paper.

The Chairman thought the public had the matter in their own hands. They had only to demand it. Messrs. Marion, at one time, made a general announcement that they used 4 per cent. of chloride, and stated at the back of each sheet which chloride was used.

Mr. Dawson said that any statement would be somewhat fallacious. Albumenizers began with a certain strength in the morning, and first prepared the slightly albumenized paper, and after some evaporation, that requiring a higher surface was prepared. If they began with 10 grains in the morning, it might be 20 grains before night.

The Chairman said there would never be that difference.

After some further conversation, votes of thanks were offered to Mr. Dawson and to Mr. Smith.

Mr. Bockett showed a little camera for medallion pictures, the especial feature of which was a delicate arrangement, like the fine adjustment of a microscope attached to the sliding body of the camera for focussing.

Mr. Bockett promised, for the next meeting, a paper on "Cheap Contrivances for Photography," and Mr. Dawson said he would point out a material defect in the general construction of dark slides.

The proceedings then terminated.

Correspondence.

A PHOTOGRAPHERS' RELIEF FUND.

Dear Sir,—The necessity of forming a Benevolent or Provident Fund for photographers, seems to be forcing itself on the consideration of all parties concerned, and, in response to your invitation to a correspondence on the subject, I beg to offer a few suggestions which may prove useful, and facilitate the formation of the society itself.

Mr. Wall has very pathetically told us in his paper, read before the last meeting of the South London Photographic Society, how the "Artists' Joint-Stock Fund Society" came into existence, and the case of Mr. Goddard, though not so melancholy, is somewhat analogous, and may in a similar manner be the origin of The Photographic Benevolent and Provident Fund.

In soliciting and receiving subscriptions to the "Goddard Relief Fund" on behalf of Mr. Hughes, I have had many opportunities of hearing the expressed opinions of photographers themselves, on the necessity of establishing a fund of "some kind," to provide against the possible approach of poverty and want in their old age, and, while each has expressed the hope that it might not be his lot to require the aid such a society would afford, they have one and all expressed their readiness and willingness to become associated with the thing as soon as it could be organized. But, "Who is to do it?" has always been the stumbling question, and, "Who is to do it?" is still unanswered. To settle the unsettled question, and make what is everybody's and nobody's business the business of somebody, I beg to suggest that you, as a member of the "Goddard Relief Fund," should, through the columns of your widely circulated journal, convene a meeting of photographers in the metropolis at a convenient time and place, to consider this all-important subject. I think there is no doubt whatever of securing a goodly muster of metropolitan photographers, both of employer and employé, and, I also think that the provincial photographers are sufficiently alive to the importance of the step to send delegates to the meeting.

I certainly think, if this suggestion be acted upon, that a large gathering of photographers will be secured, out of which the society might be organized and the necessary machinery for working the same obtained, by passing resolutions, electing a president and vice-president, directors, secretary, and treasurer, &c. &c.

As a rule, I am not much given either to writing or to quoting, but the importance of the subject has induced me to do the former, and at this period of Shakespearian excitement, I cannot avoid quoting this very *à propos* passage,

"If it were done, when 'tis done, then 'twere well it were done quickly."

I quite agree with you as to the kind of society it should be. Photography has amongst its votaries such a varied and opposite class of workers that it is almost imperative that it should be a combination of both a benevolent fund and a provident society, in which the wealthier members could exercise their benevolence, and contribute their share to the relief of poorer and unfortunate devotees to the art which affords them so much pleasure in its pursuit, and which would also encourage and foster among the poorer members that providence, which would fully entitle them to the friendly help of the society, without in any way making them the recipients of a charity. There are many ways in which this could be done; 1st. The wealthier votaries of the photographic art, such as amateurs and employers whose positions are beyond the possibility of ever requiring the aid of the society could purchase life memberships, for a specified sum. This would give the society sufficient funds to start with, or, they could enroll themselves as annually subscribing members of fixed amount which would entitle them to one or more votes in securing an annuity or gift to one they were interested in, or such other privileges as might be hereafter accorded to them.

2ndly. Ordinary subscribing members could contribute fixed sums, monthly, quarterly, half yearly or yearly, in advance, to secure to them deferred annuities, or other forms of relief in time of need, as their cases might require.

3rdly. Provision could be made for the widows and orphans of photographers in the form of life assurances and endowments, or asylums and colleges for the maintenance and education of orphans, &c. All such subscriptions to be

regulated according to the most liberal and trustworthy calculations of experienced actuaries.

4thly. The funds of the society might be enriched by bequests from lovers of the art, or increased by the sale of photographic works at the annual exhibitions of photography. I am sure there are many amateur and professional photographers who would gladly give the proceeds of their art-love to a photographic benevolent fund, when at present for want of a use they do not even think of offering many very beautiful and valuable works for sale.

5thly. For such a society patronage of the highest character could be obtained, for it is well known how much our beloved Queen is interested in, and admires the art. While one or more of our princes, Prince Alfred I am certain practises photography.

These are but crude suggestions, but out of them I hope something better may be devised. Wishing the "Fund" may be speedily brought to the starting point, and the ominous query, "Who is to do it?" for ever got rid of.—I remain, dear sir, yours very truly, J. Werge.

[We shall be happy to take any steps in the matter, and will confer with our coadjutors in the "Goddard Fund" on the subject. In the meantime, we shall be glad to receive further suggestions.—Ed.]

THE GOLD QUESTION.

Dear Sir,—Notwithstanding Mr. Keene's recent letter, I am of opinion that no protochloride of gold is present in the preparation sent out by me. I cannot of course answer for any that may be made by others. I hold to this opinion for two reasons, first, that it dissolves completely, though somewhat slowly, in water; and second, that in the course of manufacture it is never submitted to anything like a temperature of 450° Fah., which is necessary to produce protochloride of gold.

The only possible advantage which could arise from having a portion of insoluble protochloride present, would be the certainty of having whatever terchloride there might be in the compound completely neutral, and it must be borne in mind that whatever proportion of protochloride exists in the mixture in a dry state, it vanishes very quickly when treated with water, splitting up as it always does into terchloride and metallic gold. *Photographers should always preserve the sediments of their gold solutions and toning baths.*

The cloudiness alluded to by Mr. Keene, on diluting chloride of gold solution, very frequently arises from the presence of a minute portion of chloride of silver, formed from the silver existing in the original metallic gold. It is possible, and, I believe, even probable, that protochloride of gold is soluble to a certain extent in a solution of ordinary terchloride of gold. I regret that my time is so fully occupied at present as to prevent full investigation of the subject. I feel certain, however, that many gold compounds have yet to be accurately studied.—Yours very truly, Francis Sutton.

THE TWOPENNY PIRACIES.

Dear Sir,—Fully endorsing the sentiments of those gentlemen who have condemned the "twopenny piracies," I enclose the following extract from the *Leeds Mercury* of Friday last. There are several cases which have come to my own personal knowledge quite as glaring.—Yours truly,

W. Wilson.

Slingsby, March 16th, 1864.

PHOTOGRAPHS AND POSTAGE STAMPS.

To the Editors of the "Leeds Mercury."

Gentlemen,—Seeing an advertisement regularly in the papers, I am induced to caution the public not to send any stamps until they receive their photographs and portrait back again. Some time ago I sent a portrait and forty-four stamps to a party in London, who regularly advertises, and got acknowledgment by return. After waiting two months, I wrote three letters before I got a reply, and when I threatened exposure, he wrote that he had mislaid my portrait. I then wrote four letters for my stamps, but got no answer. When in London, last week, I called upon the gentleman at the gallery in question, was shown by an old woman up a narrow dark stair, and into a small room, where I found a young woman and a bearded fellow amongst lots of dirty-looking photographs. I told him my name and errand. At first he said he had never received my portrait, but when told I had his receipt, he said they had been forwarded. I told him it was an imposition, and demanded my portrait and stamps, and on looking over a drawer full of portraits I found mine, and put it in my pocket, and demanded my stamps, but he refused to give me them, and wished me to leave my portrait. Being an old family one, I was only too glad to get it, so I came away minus my forty-four stamps, but rich in experience, and made a memorandum in my diary "Never trust people who want payment beforehand."—I am, yours, &c., A Victim.

[We have received copies of the above letter from several of our correspondents, who concur in regarding such victims as rightly served.—Ed.]

NITRATE OF SODA IN THE PRINTING BATH.

A SOLICITATION.

Dear Sir,—As the collection of facts is of the utmost importance in deciding the utility of nitrate of soda in the printing bath, allow me to make a proposition to your readers. There are many reasons why professional photographers are unwilling to demonstrate before our societies the ignorance of the opponents of this mixed printing bath; these reasons I need not state. I have no time at present to find a sufficient number of specimens myself, and a long and dangerous illness preventing my doing anything with the camera the whole of last season, I have but few negatives in my possession. Under the circumstances, I shall be obliged if photographers who use this bath will forward me several good specimens of its results, in order to bring the subject before one of our societies. These specimens shall be returned afterwards, if desired, and I pledge my word that I will not mention the names of any persons forwarding them, without their own permission distinctly expressed; nor will I afford any clue whereby the places they were received from can even be guessed at. I merely wish it stated the proportions used in bath, whether the sender be professional or amateur, whether I have permission to mention his name, and whether I may *retain* the specimens or *not*. I sincerely trust that all photographers who are anxious for the dissemination of *truth*, will comply with my request, as by this means the subject will receive a wider elucidation than by any other means. Specimens to be forwarded to my own address, but if *preferred*, they can be sent for me to your own.—Yours truly, George Price.

18, *Mornington Road, New Cross Road, Deptford.*

PRINTS IN MADDER.—WEAK SILVER BATHS.

My Dear Sir,—In an early number of the News, I suggested the possibility of fixing a mordant by the action of light, so that a positive print might be dyed any shade of purple in a bath of madder, and the whites afterwards bleached. I think Mr. Kopp's potassio-ammonia chromate would enable this to be done, if a fabric called "satin jean," which I mentioned then, was used, as this might be boiled in the madder bath, and would bear bleaching. Colours similar to silver prints might readily be obtained by the use of madder.

A great deal has been said lately on the subject of weak silver baths. Some years since I give a formula in the News for a bath of ammonio-nitrate of 10 grains only to the ounce

used with alcohol, and I found it gave very vigorous prints. It was extremely sensitive, and never discoloured, but with some samples of albumenized paper it dissolved the albumen. —Believe me, yours very truly, Thomas Barrett.

WEAK *v.* STRONG BATHS.

Dear Sir,—Permit me, through the medium of your Journal, to put two or three questions to Mr. Hughes, as an answer to a paper lately read by him before the Glasgow Society; as, from the remarks made by him, I do not think that he is at all conversant with the necessary conditions to work a weak printing bath successfully.

Question No. 1.—Supposing you were out taking views, and you happened to come across an old castle, black and grimed with age, and you wished to get rather more contrast than you found you could get with your iron developer, which you had made up for general purposes, of 10 or 15 grains to the ounce, would you prefer to strengthen it to 50 grains, so as to bring out the middle tints as quickly as the blacks in your negatives, or decrease it to 5 grains, so as to go on depositing the blacks, leaving the middle tints far behind?

No. 2.—But supposing you were now to meet with a nice clean modern grey stone church, with a few thriving evergreen oaks in the garden surrounding it, with, perhaps, a healthy yew tree or two, which would you now do, decrease the developer, so as to solarize or burn up the church, without getting any detail in the foliage, or increase the developer, so as to get out the evergreens at the same time as the light coloured building?

No. 3.—Now, to apply the above to printing, which would you prefer for printing a soft negative, full of detail, but thin; a highly salted (10 grain chloride) paper and a strong (80-grain nitrate) silver bath, that is very sensitive and rapid, and which will print through the middle as fast as the transparent parts of the negative, and which requires printing in the weakest light to preserve the contrast as much as possible; or, a weakly salted (3 or 4 grains chloride) paper, and a weak (40-grain nitrate) silver bath, that is not so sensitive, but will allow the transparent parts of the negative to print through, allowing the middle tints and blacks to remain far behind hand?

I cannot but think from the above, that Mr. Hughes will, with his usual sagacity, soon see where he has failed in comprehending the working of weak baths. The question that he proposed to the Glasgow Society should have been in this form:—Which is best for a thin soft negative, a strongly salted (10 grains chloride) paper, and a weak (40-grain nitrate) bath which, having so little free nitrate in proportion to the chloride, gives a weak thin image, which tones in a faintly alkaline gold bath to a dirty grey, and in a strongly alkaline one to a seedy brown, or to float the same paper on a strong (80-grain) silver bath which, if printed in a weak light, will allow some metal to be reduced in the paper, and give a good rich image? To which I unhesitatingly answer the same as Mr. Hughes, of course, the latter; but if the question is put as I have before stated, namely, of which is best and most economical for the class of negatives, which, since the introduction so much of iron, as a developer, nine-tenths of all that are ever required to be printed, are produced; a weak salted paper and weak silver bath, or a strong salted paper and a strong silver bath? then I cannot but say I prefer the former; and I believe I am confirmed in this by the opinion of one of our most celebrated portraitists, to whom the members of the Photographic Society are indebted for a portrait of their president. And here I would suggest a probable cause of the extraordinary discrepancy in the experiments of two most scientific, careful, and honest men, in their trials of the effect of nitrate of soda, when mixed with a weak silver solution, in rendering the surface of albumenized paper insoluble or not—I mean Mr. G. Dawson and Mr. Price. I have not experimented with nitrate of soda, so cannot give any experience myself; but, from the remarks of "Photographer's Assistant" and others, that they only succeed with *some* kinds of paper; and Mr. Dawson, giving out in his, that he prepared his paper with 10 grains of chloride to the ounce; might not his failure be accounted for by the using much too highly salted a paper; and the others' success by their getting hold of a weakly salted sample? Several of the large paper preparers are not sending out low salted papers; and should the above be the case, it only shows more and more what has been urged over and over again, that makers should stamp every packet sent out with the amount of salt they put into it.—I remain, dear sir, yours truly, Francis G. Eliot.

Dear Sir,—I have been very much interested in reading the excellent article on "Strong and Weak Printing Baths," by Mr. Jabez Hughes. My own experience being similar to his, one batch of prints being spoiled from the bleaching he speaks of. Under the circumstances, of course, it was natural to attribute the failure to the reduced strength; but the thought occurred to me that the toning bath might probably have had some influence in producing the annoying result. Accordingly, I tried again, and found by repeated experiments with lime toning, that much over-printing was not necessary; in fact, that the bleaching which I wanted to avoid depended very much on the *quality* as well as the *quantity* of *chloride of lime* employed, and that proportion might be used which would give excellent results with weak (30 to 40 gr.) silver baths.

The toning bath is prepared only a short time before using, as follows:—

Chloride of lime (dry)	...	...	... 1½ gr.
Carbonate of lime ...	...	...	... 18 ,,
Chloride of gold (sol.)	...	...	... 1½ ,,

put together into any convenient vessel, and pour on 10 ounces of water (I use ordinary pump) at a temperature of about 130° to 140°. I find attention to this to be very necessary. Stir well, and let it settle for 20 minutes, when it is ready for use; it should then tone well, especially if kept at a temperature of 70° or 80°; but if it show any tendency to inflict measles, a remedy (certain), which I think Mr. Blanchard first suggested, may be applied, viz., *one drop* of liquid ammonia.

I send you a few prints; in the portraits I fancy there is a little life, although they have been taken by what the *Times* would call the "Soulless Operation of Camera and Chemicals" —(article on portrait of Thackeray.—I am, sir, yours obediently,

Sandbach, March 16th, 1864. Wm. Fox.

Sir,—Mr. Hughes, having invited his professional brethren to state their views respecting weak or strong silver baths for sensitizing photographic papers, I beg leave to offer my humble opinion, as fully corroborative of his in every particular.

I have a goodly number of negatives to print from in the course of the year, and there is no moral doubt in my mind, that if you have anything like delicacy in the negative, that it necessitates a tolerably strong bath during the winter months. I use from 80 to 90 grains, and keep to that strength with all weak negatives. I dare say that a 60-grains solution might be used with like result, but I feel pursuaded that under that mark (and with negatives such as I have described), such brilliant results are not obtained. I also knew that in my hands hard negatives are vastly improved by using the silver solution weak—say 40 grains. This by itself, or weaker, combined with nitrate of soda, will be found to give the most satisfactory results.

I am led to these conclusions, not from experimenting, but from observations which are constantly occuring in my establishment; having baths prepared for both classes of negatives, it not unfrequently happens that the papers get misplaced, and when such is the case, I have invariably to discard them, as bearing no comparison with those rightly in order.—Yours very truly, F. W. Evans.

[Mr. Evans encloses us two prints from the same negative, of Eliza Cook, one excited on a weak bath, and the other on a strong one. The latter is much the best.—Ed.]

RUINOUS COMPETITION AND MISCALLED CHEAPNESS.

Sir—In the Photographic News of the 4th instant I read some very just remarks upon the evil of cheapness. I fear it cannot be remedied whilst the facilities for entering into the photographic profession are so many, and the public have so little chance of being assured that by giving a higher price they will get a better article. Country towns are crowded with petty tradesmen who take up photography for the purpose of adding to their scanty means; many of them being too obtuse to command a trade in a business at which they have served an apprenticeship, are not likely to become skiltul photographers; they are therefore obliged to offer their productions at low prices, and having *some* employ at their legitimate callings to maintain them, they are able to compete with each other until the thing is hardly worth doing. In my own neighbourhood there is a tinman, a blacksmith, two house-painters, two saddlers, and two barbers; each at his commencement has began at lower and still lower prices; until they are nearly at starvation point, and they are about as much fitted by education for photographers as generals of an army. This is the class that perpetuate enormities of all kinds and call them pictures.

Supposing, at the best, these things are cleanly manipulated and tolerably in focus, how then is an uneducated public to discriminate between them and artistic productions. You, my dear sir, moving amongst highly educated classes, can hardly imagine the gross ignorance which exists on artistic matters only this morning, having to take a view of a shop having an octagonal front, the owner would insist that I could show each pano in full, or, in fact, that the lens must see round the corners. I believe that the educated public would put faith in men whom they were certain had passed through a conrse of study fitting them for the profession. What then could be better than certificates granted by public examination before authorized professors in the various branches of knowledge required; medals might also be added as honorary distinctions. This conrse would raise the profession in its own estimation and that of the pnblic, would be a guarantee to parents placing apprentices, and a security to masters requiring assistants, and throw the ignorant and unworthy members of the profession into the shade. This, sir, I only offer as a suggestion, feeling that, unless something is done, photography as a profession will not long continne in the remunerative or respectable, and hope that some of yonr more talented contributors may mark out such a courso as may raise so beautiful an art to its legitimate station.—I am, dear sir, yours truly, T. P. E.

Sir,—Your correspondent "Fair Play and No Favour," writing from this unfair town of Brighton, laments the decadence of the art, and the skinflint prices which are at present the rage. I hear that further reductions are contemplated by some of the levellers, and it will soon be a glass of gin and your carte de visite, one shilling; but it is consolatory to know that this unhealthy state of things cannot last, as some of the over cheap shops must soon collapse, unless they have all their materials, house-rent, &c. &c., given to them—then, like the Kilkenny cats, they will leave but their tales (tails)—pleaso to excuse me—behind. Unfortunately, there seems at present a rage in Brighton for this cheap trash, and if a large number of card pictures are given for a small sum, tho quality does not seem of much importance.

Now, I believe that if the respectable photographers of the town hold out stoutly against this suicidal innovation, the one shilling mushrooms will sink into the obscurity from which they emerged, and our cameras may be dusted, baths filtered, &c. &c., and a few fresh negatives added to the stock of

Brighton, March 9, 1864. A Brightonian.

[We have received several other letters on this subject of miscalled cheapness and suicidal competition; but we have pnblished sufficient to illustrate the evil, and that it is widely felt. We shall be happy to give publicity to further practical suggestions for remedying the evil.—Ed.]

THE GENERAL PHOTOGRAPHIC EXCHANGE CLUB.

Dear Sir,—As you kindly gave the plan of a proposed new photo-exchange club, a place in your last number of the 24th inst., will you oblige me by stating in your next that any of your subscribers, who are willing to join and give assistance to the formation of the club, may forward their names and addresses in the first instance, to Mr. Matthew Whiting, Jun., Lavender Hill, Wandsworth.

March 30, 1864.

Talk in the Studio.

The New Carbon Process.—Mr. Swan intends to read a paper on his new carbon process at the next meeting of the Photographic Society, to bo held in King's College, on the evening of April 5th.

Female Photographic Artists.—Our valuable contemporary, the *Scientific American*, has fallen into an amusing error, from reading our announcement, that the next Photographic Exhibition is to be held in the Gallery of the Female Artists, and arrived at the conclusion that they are female photographic artists. This conclusion being arrived at, some excellent remarks follow:—"The art of photography is so simple and so easily acqnired that it seems to be especially adapted as an employment for women. Its manipulations require a certain delicacy of touch, gentleness and quietude which are the natural attributes of females; no part of its attendant labour is rough; many of its operations may be done in a sitting posture. It is by no means as difficult or laborious as ordinary needlework; while its various operations and processes present to the mind objects of unceasing interest. In England there are many women engaged in tho art, both professionally and as amateurs. The Exhibition Gallery of Female Photographic Artists, Pall Mall, London, is one of the finest establishments in that city."

Reproduction of Old Paintings.—It is stated that photography has been employed to reproduce the designs of the illuminations of the celebrated "Breviario Grimani," preserved in the Library of St. Mark at Venice; but these earliest specimens of the Flemish School—of the pupils of Van Eyck, Hemmelinck, Messina, Vander Meire, &c.—lose much of their value by the absence of colour, though their quaintness and originality is admirably preserved in these photographs of MM. Perini and Zanotto, of Venice.

Difficulty of Making Perfect Lenses.—Professor Draper says on this subject:—"For a perfect lens something more is needed than a perfect theoretical construction. Tho suitable curves being ascertained, and suitable glass provided, the mechanical execution involves difficulties infinitely greater than is commonly supposed. I have had myself very extensive opportunities for the critical examination of optical surfaces, not so much for the purpose of ascertaining whether they were good enongh for sale, as whether it was possible to make them mathematically correct. You will find it often stated in books that it is the easiest thiug to grind and polish for instance a true spherical surface. I can assure you that it is nothing of the kind, and that the best American and European artists cannot form such a surface in which the methods of examination now known and practised will not find defects. Of all mechanical operations, that of imparting to a piece of glass a determinate and absolutely correct mathematical figure is one of the most difficult and delicate."

Measure of Light.—Professor Draper, in his recent address to the American Photographic Society, at the annual meeting, made some good remarks on the want of a standard of measurement for light. He said:—"No invention could bo more useful in optical science, than that of a photometer which would give its indications in degrees, as a thermometer does in the case of heat, such indications being absolute and not matters of opinion. All persons read the degree at which a thermometer is standing alike, but it is by no means uncommon for two persons to disagree respecting the equal darkness of two shadows, the eqnal brightness of two lights, or whether a given luminous effect has ceased to be visible. Yet these are the indications to which we resort in the most approved methods for the measnrement of light. Moreover, most of our photometers are merely instruments of comparison. They require a standard light, with which the light to be tried must be contrasted. As yet, no snch thing as an absolute measure or unit of light has been invented. The nearest approach to it is, I believe, contained in a suggestion formerly made by me—the heating of a piece of platinum, by a voltaic current, to a definite tempera-

ture, as, for instance, 2,500 degrees. At the same temperature the light is constant, and the temperature can be absolutely determined, and even kept uniform, by the expansion of the platinum. Until some such principle is adopted, photometers cannot be made to compare with one another."

Too Particular.—Whether there *is* such a thing as a photographer being too particular about his pictures or not, is a question yet undecided, and we open it for discussion, taking sides with the negative. A few days ago we overheard two photographers in conversation. One had risked his fortune in the practice of the art, and failed. The other began in a small way a few years ago, and at about the same time as his colleague, and is now doing a thriving business, in one of our finest galleries. Seated at a table, the latter was examining a lot of pictures just finished, and awaiting his inspection. Picture after picture was thrown aside and condemned as being either too dark or too light, or else spotted, or soiled, or crookedly mounted. For some time did he continue this, until the other declared him entirely too particular. Customers would not see these defects, and it was a useless waste to condemn such good pictures. They discussed the matter freely, until our particular man declared he had ever carefully examined all work that left his rooms from the time he commenced the business, and he believed it was the secret of his success. Many times after finishing up a lot of pictures ordered by a customer, he has refused to let them be delivered, and made the parties re-sit. This is the right plan. Have a standard, and make your pictures come up to it. A good picture is sure to bring you at least another good customer. A bad one may drive a dozen away from you. Honesty is the best policy. Make good negatives; have good prints made; tone and wash them properly; have them nicely trimmed and mounted, carefully pressed and polished, and then once more inspected before delivery, and rest assured sensible customers will not complain, and success will be your deserved remuneration.—*Philadelphia Photographer.*

To Correspondents.

J. A. L.—The production of paper negatives, either by the calotype process or the wax-paper process, is much too lengthy and complicated an operation to be described in this column. You will find a very clear and simple description of the calotype process running through several numbers of our first volume. In answer to your specific questions: Turner's, or Hollingworth's paper; a 30-grain nitrate bath; and by the usual method of printing.

P. O. O.—If you had stated some details of the process used, &c., we could have given you a more certain answer. So far as we can see, your negative is slightly fogged by pushing the intensification, and the granular deposit has been formed by so pushing it. The use of an old and slightly decomposed collodion would favour the result, as would also some conditions of bath.

Evelyn.—If you find a tendency in the pyroxyline to dissolve in the acids, increase the proportion of sulphuric acid. The probable reason for the paper dissolving in acids which did not dissolve cotton-wool, may be that the paper was slightly damp. Cut it into strips, and fold them backwards and forwards, so that they may be crimped, and so prevent sticking together and matting in the acids. Also dry them well before immersion.

W. L.—The needle-like crystals in your silver bath were probably iodo-nitrate of silver, with which the bath had become supersaturated. The addition of an equal bulk of uniodized solution will remove them. Or for more effectually affecting this, dilute the bath with an equal bulk of distilled water, filter out the turbidity, or precipitate, and then add silver to make up the proper strength.

A. B. C.—We should prefer A. No. 3.

Bad Prints.—These are general signs of slovenly manipulation; but the dirty brown stains are caused by imperfect fixation. The hypo-bath is old or weak, or the prints have not been properly immersed, probably stuck together. The result is the formation of insoluble hyposulphite of silver, which readily decomposes in the print, causing the yellowish-brown stains.

E. S. G.—Longer toning would probably produce better results; but with a bath prepared as you describe, it is quite possible the toning qualities rapidly cease. See the chapter on "Toning Baths" in our last Year-Book. Use more intense negatives, and allow the toning to proceed further, and, unless your paper be very faulty, you will obtain much better tones.

H. Gaston.—If you had sent us a specimen of the defect we could have judged better. Use half the quantity of gelatine, and apply it with the salting preparation. See Mr. Smyth's article on the subject in our Year-Book. The prints produced by the formula there given are exceedingly fine.

Rankine.—The black powder precipitated from a gold toning solution by the addition of sulphate of iron is metallic gold, with, possibly, some oxide of iron. To remove the latter, wash with dilute sulphuric acid, and then with clean water. It is then ready for being converted into chloride of gold by the application of nitro-hydrochloric acid. Or, if you desire it, you can run it into a button in the crucible.

E. E. Dyson.—You will obtain pure nitrate of silver free from contamination by precipitating a bath as a carbonate, and redissolving with nitric acid, if you carefully follow the instructions, and avoid dissolving the last traces of the precipitate. The nitrate may then with propriety be used as a printing bath.

Ignoramus.—A spirit varnish always requires the aid of heat in drying. There are various varnishes which do not, however, require heat, such as amber or benzoin dissolved in chloroform; dammar, &c., dissolved in benzole. To make good varnish requires, however, considerable experience. It is not an operation which we can recommend to our readers, who will generally be able to purchase a better and cheaper article than they can make. 2. We do not know anything of the lens you name.

A. A.—Good glass dippers are very easily made; we generally make our own, and rarely use any other. Bending the end of a strip of glass is rather a difficult operation to perform well, especially to those not familiar with working in glass. The best plan is to proceed as follows:—Procure a strip of stout plate-glass, about an inch and a half broad, and of the desired length. Cut off the end with a diamond, a narrow strip about one-third of an inch broad. Now heat the narrow strip and the end of the larger piece in the flame of a spirit lamp, and apply marine glue to the surface of each, and press the cemented surface of the small strip to the similar surface at the end of the other, rubbing them together a little. If this be managed properly, the narrow strip will be cemented firmly on to the end of the other, forming a shoulder or ledge on which the plate will rest when in use.

Regular Subscriber.—There is no work upon the manufacture of photographic lenses. 2. Mr. Hardwick has retired from photography, and entered the church; his residence is now at Shildon. 3. Of the names you mention, we prefer the second. 4. Chance, of Birmingham, is the manufacturer of the best optical glass.

Thomas Collins.—We will make the examination, and report in our next.

Chemicus.—Nitrate of soda is not usually employed to adulterate nitrate of silver. We have no reason to believe that nitrate of silver is adulterated at all; we never met with but one sample, and that some years ago. It was adulterated with nitrate of potash, which is the most likely salt to use for such a purpose. Nitrate of soda would be very unsuitable, and would almost certainly lead to detection at once, as its crystals are cubes and are altogether unlike those of nitrate of silver. We cannot, of course, say whether it ever has been so adulterated or not.

F. G.—Chloride of lime, or "bleaching powder;" not chloride of calcium.

Wm. Henry.—We cannot state with certainty the cause of the spots in your prints. We once met with very similar results from very small particles of citric acid having come in contact with a print first after it left the hypo bath.

Montpelier.—You may cover the door with a black blind, with an aperture cut in it just sufficiently large to admit the cone of rays approaching the camera. A trial will enable you to determine the size of the aperture. 2. We believe the article is cheap, but we don't know the price.

M. D. E.—Powder colours may be applied to prints on albumenized paper, if they are to be preserved under glass, but they would easily rub off otherwise. For card portraits water colours are generally used, and sometimes for large pictures; for the latter we prefer oil. Some skill is, of course, necessary in colouring; but, if you can use the pencil, photographic colouring is not difficult.

G. G. F.—A deal camera may answer for some purposes, but it is difficult to prevent it from warping, twisting, &c., with moisture and change of temperature.

"One of Them."—There may possibly be a good deal of ground for the remarks of our correspondent in the conduct of many employers, but it is doubtful whether his suggestions would meet the evil. We fear that a tendency to shirk honourable engagements is not always confined to employers. Is our correspondent beyond reproach in this respect?

Exchange Club.—We have received several applications for membership. The list will be published shortly.

Several correspondents in our next.

Photographs Registered during the Past Week.

Messrs. Cramb, Brothers, 67, West Nile Street, Glasgow,
Photograph of Professors of Medical School, Anderson's University, Glasgow.

Mr. Pryce Jones, Regent Street, Wrexham,
Two Photographs of Rev. Evan Evans.

Messrs. W. and D. Downey, Newcastle-on-Tyne,
Photograph of Mr. T. H. Stead, in Character, as Singer of the "Cure" and "Sensation" Songs.

Mr. A. Findlow, Smith Street, Warwick,
Photograph of William Shakspeare, from an Original Engraving of the Chandos Picture.

Mr. Frederick Downer, High Street, Watford,
Three Photographs of the Earl of Essex.

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth,
Photograph of Sir E. Lacon's Father, from Oil Painting.

Mr. J. Bateman, 51, St. George's Street, Canterbury,
Four Photographs of Miss Eleanor Armstrong.

Captain A. G. Tod, 2, North Parade, Cheltenham,
Three Photographs of Rev. Dr. Muir.

Mr. Robert Day, Bournemouth, Hants,
Photograph of Rev. B. Howard Stafford, of Sopley, Hampshire.

Mr. John Robert Sawyer, 46, London Street, Norwich,
Photograph of Rev. J. Bailey.
Photograph of Rev. Jno. Aldworth.
Photograph of Rev. Arthur Roberts.
Photograph of the Castle Hill and Market on the Fair Day at Norwich.

Messrs. Pettitt, Brothers, 30, Paradise Street, Birmingham,
Work (registered) entitled "Photographic Book of Beauty."

Messrs. Appleton and Co., Bradford,
Photograph of Rev. T. Champness.
Two Photographs of Rev. A. Barrett.
Photograph of the late Rev. P. Hardcastle.

Mr. William S. Shirras, 40, Broad Street, Aberdeen,
Photograph of William Shakspeare, from an Oil Painting.

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THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 292.—*April* 8, 1864.

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MR. SWAN'S NEW CARBON PROCESS.

We are now in a position to place the details of Mr. Swan's new carbon printing process before our readers. A complete description, with working details, was given to one of the fullest meetings of the Photographic Society we remember to have seen, on Tuesday evening last, and the capabilities of the system illustrated by a few dozens of specimens, all of first class excellence, including portraiture, landscape, and marine subjects, from card size to ten by eight. Every specimen exhibited fully justified the admiration we have already expressed in regard to the productions of the process. Some of the delicate instantaneous sea views from negatives by Mr. Wilson were exquisitely beautiful, as were also the portraits. Of the large pictures, Mr. Bedford, who was in the chair, remarked that they were as perfect as it was possible for photographs to be, possessing every quality which could be desired, and, as he added to us personally after the meeting, they were not simply equal to silver prints, but superior to them, possessing a general brilliancy, a delicacy of detail and transparency not to be found in the best silver prints. The description of the process was lucid and simple, and was received with attention and frequent applause. A severe fusillade of questions from various persons, some of which at times assumed an unnecessary air of antagonism, only served to elucidate the subject and confirm the general high appreciation of the process.

Mr. Swan has availed himself of the existing agents and many of the known facts in regard to carbon printing, and combined these to produce a process as perfect in result and ingenious in its details as can well be conceived. With existing agents he has produced a new material which just meets the requirements of the case, and whilst, at the first glance, the method may suggest difficulty and complexity from the complete novelty of some of the operations, yet a closer intimacy with its details, such as we acquired in a ten hours' scarcely interrupted conversation with him on the subject, convinces us that it is as simple and easy as almost any other process in photography. We will proceed to describe it, however, without further preface.*

Mr. Swan's first step is to make sheets of a new material, upon which to produce his picture, consisting of collodion on one side, and gelatine, sugar, bichromate of ammonia, and pigment on the other, which we will call *sensitive pigmented collodio-gelatine*. He proceeds as follows:—Take

Gelatine	4 ounces
Water	16 „

Let the gelatine soak in the water, cold, and then dissolve with gentle heat. Next add the white of an egg, well beaten; mix with the gelatine solution, boil, and filter. This is simply a fining process, the coagulating albumen collecting and carrying down with it any impurities in the gelatine, leaving a brilliantly clear solution. Any loss in quantity is now made up by the addition of water, and then add—

White sugar	2 ounces.

The solution is now ready for receiving the colouring matter. This, in the majority of Mr. Swan's experiments, has been the finest form of carbon, namely, indian ink. But it is a noteworthy fact that any permanent pigment may be used, of which there are many of various tints. Every tone of monochrome may therefore be secured, black, bistre, sepia, &c. &c. Indian ink modified in tint by slight addition of other pigments answers, however, admirably, and gives a considerable range of tone. The pigment is got into solution by soaking or rubbing down, and after filtration, to get rid of any coarseness, sufficient is added to give the gelatine solution the right depth of colour, a point only to be learned by experience and observation, no definite quantities as yet being assignable, for various reasons. This pigmented gelatine is now ready for use, and may be preserved almost indefinitely in well stopped bottles. Now take

Bichromate of ammonia	1 ounce
Water	3 ounces

Of this solution add one ounce to from eight to ten ounces of the gelatine solution. Thus rendered sensitive, it is better used within a day or two, and the preparation should not be heated higher than about 100° Fah., which is quite sufficient to keep it fluid.

Next take plain collodion of good body, coat a cleaned sheet of plate glass, and allow it to set and desiccate perfectly. These plates may be kept ready coated for use. Now warm one of these plates, coat the collodion film with the sensitive gelatine solution, and place the plate on a levelled stand to prevent the solution running in an unequal thickness to one end, and allow it to remain until the solution is quite set; the time will vary with the temperature, a few hours being sufficient in a warm room. When quite dry, it may be stripped off the glass by running the point of a penknife round the edge, and presents a black, pliant material, very similar in appearance to a piece of the black enamelled leather sometimes used for glass positives, and similar in substance to what are generally termed ivory cards. By transmitted light this tissue is translucent, notwithstanding the presence of the pigment; and by examining it in this stage the experienced eye will readily judge whether the proper proportion of the pigment is present. The tissue is now ready for printing, and must, we need scarcely say, be kept in the dark, and used within a day or two. All the operations with the sensitive gelatine preparation will also be performed, of course, in the dark.

In the next stage, the principle now well recognized, first published by Mr. J. C. Burnett, generally attributed to

* We will publish Mr. Swan's paper, now before us, in our next.—ED.

Mr. Blair,* is carried out. We refer to the necessity of allowing the light to reach the sensitive surface, as it were, from the under side. Mr. Swan had recognized this principle before he had seen it published, but did not succeed in any application of it. Mr. Burnett and Mr. Blair published it, and Fargier, Pouncy, and others have successfully applied it, and now Mr. Swan applies it with still greater efficiency. We need not dwell upon its philosophy now, further than to say that if a coating of sensitive gelatine on glass or paper be exposed to light, the whole of the surface acted upon becomes insoluble, the insolubility proceeding downwards into the texture in the direct ratio of the action of light. The shadows would probably be rendered insoluble all through, the half-tones half through, whilst the lights remain quite soluble. It will readily be seen that when the whole shall be submitted to a soaking process to clear away the soluble portions, as the lower layer of gelatine under the half-tones is soluble, when it is washed away it will carry with it the upper half which has been rendered insoluble, so that the only portion remaining is that acted upon through its whole substance forming the shadows. The issue of this is, as all persons familiar with carbon processes know, an image without any half-tone. If, however, the light have passed through the glass or paper holding the gelatine, so as to act on the under surface first, then the upper surface may be washed away, leaving the half-tone attached to the glass or paper in just such proportion as it has been rendered insoluble, for it must be remembered that the gradations of depth are here obtained by a process similar to giving washes of different depths in water-colour drawing. A thick layer of pigmented gelatine giving a deep black, a thin layer giving a grey, and so on. It follows that, in proportion to the thickness of the layers rendered insoluble by light will be the gradation in the picture. A negative with twenty gradations in intensity will allow just as many gradations in the thickness of the layer of coloured gelatine, and therefore the same number of gradations of middle tone in the picture.

Mr. Swan then takes his tissue and places its collodion surface in contact with the negative, so that the gelatine in contact with the collodion is acted upon first. The exposure takes place in the pressure-frame, as usual, and the time of exposure varies with negative and light; but with this tissue not more than from one-third to one-fourth of the time necessary for silver printing is required. It is not quite so easy to determine when a print has been sufficiently exposed as with silver printing, although a perceptible image is formed. Mr. Swan says that experience is readily acquired, and that, moreover, much greater latitude is permissible than with silver printing. About five minutes in a good light would be sufficient with a good negative, whilst the same picture would not be irredeemably spoiled with eight, or even ten minutes.

After exposure the picture is mounted on paper before further proceeding, either starch paste, or an india-rubber cement being used. When dry, it is placed in warm water, at a temperature of about 100° Fah. This is practically a developing process: the soluble gelatine and pigment are rapidly cleared away, leaving the insoluble layer in its several gradations attached to the collodion, and revealing a charming picture. Three or four changes of water are desirable to remove all the bichromate, and Mr. Swan prefers the prints to soak about a couple of hours. If the picture be over-exposed, a prolonged soaking and higher temperature will provide a remedy to some extent. The necessary soaking and washing do not make the film leave the paper to which it was attached

A perfect carbon print on paper is now completed; but if it be left on the paper as it is, and have been printed from an ordinary negative the image is reversed. Many of the beautiful specimens we have seen are just in this condition. In subjects in which the strict preservation of right and left are unimportant, there is no reason for making a change. But where the right relations in this respect are important, another step is necessary. The print should in this case have been attached to the paper with the indian-rubber cement; and after reaching the stage we have described, it is to be mounted again, picture side downwards, on suitable paper with starch paste, and when dry, the first paper to which it was attached is simply lifted off, coming away without any difficulty. The picture is then complete, collodion side uppermost, with right and left in their true relations. If the last result be desired without the trouble of the last process, the use of a reversed, or a transferred negative, as described in Mr. Swan's paper, will effect the result.

Having thus stated the general details of the process, we must defer pointing out some of its special peculiarities and advantages until next week, merely remarking that it has some especial advantages of its own beyond absolute permanency. For instance, it is possible by the process to secure from a hard negative a soft print, and a vigorous print from a weak negative, this control over the result existing here to a much greater degree than in silver printing. The general tendency, indeed, of the process is to raise the character of photographic printing as well as of photographic prints. We mean it will give greater scope for the exercise of judgment and skill, and demand a high class of intelligence for the production of its highest results. This we consider a merit rather than a disadvantage, and we believe that amongst the highest class of photographers it will rapidly supersede silver printing altogether, especially if they endorse the remark of one of our first portraitists, that with such a process at all within the possibility of commercial operations, silver printing would be a dishonest practice.

Mr. Swan's first impulse was to give his process to the world. More experienced counsels induced him to protect it by patent. He has, therefore, secured it in this country, the various States of Europe, and in America. His liberality has still induced him to give photographers the earliest information of its details, although the law would have permitted him to retain his secret for six months, and make his commercial arrangements by showing results in the meantime. He prefers to make the process known before making commercial bargains. The precise details of these arrangements are not yet determinately fixed; but, unless the patent passes out of his hands, his intentions are very liberal. He will not seek, by obtaining large sums from a few individuals, to limit the utility of his process; but rather seeks his remuneration by imposing a nominal tax upon the many. He contemplates the payment of a small premium, and the subsequent charge of something like a farthing a picture from professional photographers, requiring that each print by his process sold shall have a small stamp or design affixed, which he will supply at something like twenty shillings a thousand. In order to avoid limiting the scope of experimental photography, or placing bounds upon progress, he proposes to place the process in the hands of amateurs unfettered, who may practice the process without any charge, so long as they do not make it a matter of trade, as he only stipulates for sharing profits made out of his invention. These arrangements are, however, not specifically determined, and must be received with the qualification of uncertainty. Should they be carried out, we see a fortune for the earliest professional printers who shall undertake to print by this method for amateurs and the profession.

In the meantime, Mr. Swan, in connection with his partner, Mr. Mawson, proposes to enter at once into the manufacture and supply of the various preparations, advancing them to the furthest stage compatible with keeping conditions, in order that experimentalists may proceed to work with the best aids to success, and the least possible preliminary trouble.

* It is quite probable that to each of these gentlemen the discovery may have been made independently; but Mr. Burnett published the idea, explaining its working very clearly, in November, 1858, and Mr. Blair not until January, 1859.

MR. TOOVEY'S NEW PHOTOLITHOGRAPHIC PROCESS.

The difficulty of doing anything in photography that some one has not done or thought of before, has often been remarked, and in reference to Mr. Toovey's patent, the specification of which we published last week, receives a striking illustration. At the time we called attention to it we had an impression that the idea was not so novel as it was ingenious, but we could not at that moment recall the fact certainly that we had met with the notion before. A letter, in another column, from Mr. Lewis, of Dublin, whose interesting communications on various processes of photolithography appeared in our last volume, calls attention to the fact that the idea of the process was very definitely stated by him in one of the papers to which we have just referred. Still more singular than this, however, is a communication made to our columns between two and three years ago, by Mr. Hannaford, now in Australia, in which not only the idea but the exact details, and in almost the exact words of Mr. Toovey's specification, are given. Mr. Hannaford was not a professional lithographer, nor had he facilities for fully carrying out into practical effect operations in that art, but his knowledge of its principles and of photography, and his singularly ingenious mind enabled him to make some good suggestions in relation to photolithography.

In our number for August 9th, 1861, in an article on photolithography, he has the following remarks:—

"To those who may have the means of conducting experiments in this direction, we offer a hint which we do not remember to have seen previously published.

"Lithographers are in the habit of using gum arabic to 'stop out' on the stone. Wherever the gum touches, although all the surface be afterwards covered with grease, those portions will print white. Now if we take a paper coated with bichromate of potash and gum arabic, and expose it under a negative, we get the well-known effect of insolubility in the exposed portions, and solubility in those unexposed. Placing the print thus obtained, face downwards, on a prepared stone, slightly damping the back, and passing through the press, the soluble parts, otherwise the whites of the picture, are transferred.

"We thus get a negative copy of the photograph on the stone. When dry, the whole surface may be covered with grease, after which the lithographer may proceed in the usual manner."

The exact value of the process we cannot, as we said in our last, properly estimate without further evidence; but it is clear that whatever value it possesses belongs to the public, and is not in any way reserved by the recent patent.

PHOTOGRAPHS FOR THE AMERICAN SANITARY COMMISSION.

We recently called the attention of photographers to an appeal from Mr. Anthony, of New York, to the photographers of this country, on behalf of a fair, the proceeds of which are to be devoted to the relief of the wounded soldiers, North and South, who are under the charge of a Sanitary Commission. As we before said, this is an object which appeals to mankind generally, and still more closely to Englishmen, as claiming a closer relationship to American citizens than that of common humanity. Another fair, for the benefit of the same fund, is about to be held in Philadelphia, and Mr. Coleman Sellers, a gentleman whose name may be familiar to many of our readers, in his recent letter to our contemporary, the *British Journal*, makes another appeal to English photographers, for photographic contributions. We have been favoured with a copy of this letter by the Editor of our Contemporary, to afford us an opportunity of calling the attention of our readers to its object. We shall make some extracts from it in order to explain its purpose, and at the same time we add our earnest hope that the appeal will meet with a worthy response. He says:—

During the first week of June next will be held, in Philadelphia, one of the great fairs in aid of the Sanitary Commission. It will be styled the "Great Central Fair of the Sanitary Commission."

The Commission has appointed committees in every department of art and trade, and to these committees the collection of the articles for sale has been entrusted. The department of photography has been given to Mr. Frederick Graff, 1,337, Arch Street, chairman, assisted by Messrs. Guilloù, Fassit, Sergeant, Davids, Sellers, Borda, Cresson, and Sturgis, of Philadelphia, and Captain Brereton, of Pittsburg, Pa. Mr. J. C. Browne, 907, Clinton Street, Philadelphia, is secretary, and Mr. S. F. Corlies, 1,717, Arch Street, is treasurer to the committee. The donations solicited are of everything connected with the art, such as mounted prints of every kind, portraits of distinguished persons, copies of original drawings, paintings, and engravings, local and other views, microscopic objects, stereographs, magic-lantern slides, or, in fact, any objects of interest connected with photography and likely to prove saleable.

My pen is unable to convey to you the slightest idea of the value of the organisation as it now exists, and as it has been perfected during the past three years. Could you, as I have done, talk to the poor wounded soldiers who throng our hospitals, and hear what they say about the Commission—how they thank it for their very lives—you would feel, as we do, that no better work can be done than aiding this pre-eminently Christian enterprise. It is no enviable task the noble members of the Commission have undertaken. In war they see all that is revolting—all that makes the heart bleed with anguish—and yet they have none of the excitement of the soldier's life to sustain them. A veteran once said to me—"The place I like in battle is the front, no matter how hard the fight may be; but to be placed in the reserve, to see the poor wounded fellows carried to the rear, and to hear their cries and see their suffering, this is unbearable." And yet this is the place accepted by choice by the Sanitary Commission. The soldiers rush on or retreat from the field of strife, and soon the scene is forgotten in the excitement of fresh adventure; but when the air is reeking with the horrid effluvia of a stale battle-field, the Sanitary Commission have their work to do. It is to aid them in this task of charity—this attention to BOTH FRIEND AND FOE—that we beg for substantial aid.

Articles may be sent by express, free of charge, by the donors, the freight charges, if any, being arranged by the Sanitary Commission here. Every package should be marked *for the purpose of the fair only*, and then they will pass our custom-house free of all examination or charges.

As a hint for what would prove the most saleable, I would say that views of English scenery and of ruins and places of historical interest are very desirable; for England's history is our own history, as its language is our language. Pictures of distinguished men are sought after with avidity; and if we could only have the cards of those men who have done so much to advance our noble art—pictures of photographers, professional and amateur—I know of one who would purchase freely, and would keep them, too, with care; and he is not alone in his desire to see the faces of those whose work with the camera or with the pen has so much interested us. I could tell you of a little album, not far off now, in which can be found friend Rejlander "looking up for better days;" H. P. Robinson, with his thoughtful brow, the joint representative with Rejlander his of art-photography; Mr. Shadbolt, Mr. Dawson, Mr. Hardwich, and many more, not forgetting my kind friend the publisher of *The British Journal of Photography*; and at the end is one half of a stereograph of a photo-picnic one Good Friday, some years ago, in which, with the aid of a microscope, Mr. Simpson, of the *News*, and many more can be made out. The pleasure with which this album has been examined at the Society's rooms and at home shows the interest felt in the people whose faces are there represented. Microscopic subjects would be as good as gold, for there are a great many in our little city who are interested in this instrument.

We hope that liberal contributions will enable the Committee to make the photographic department an attractive feature of the fair.

COLEMAN SELLERS.

GUN COTTON is recommended as a filter for strong acids and other liquids decomposing other substances used for filtering.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Analysis, and Adulteration.

Lead (*continued*).—The compound which this metal forms with sulphur is deserving of some little attention, as upon its inert properties in the presence of chemical agents depend many processes of importance in the arts and manufactures. The affinity which exists between lead and sulphur is very great. When pieces of lead-foil are introduced into the upper portion of a florence flask, which is filled with sulphur vapour (some liquid sulphur being kept in ebullition in it by means of a spirit lamp), the metal takes fire and burns with a dull red light, drops of fused sulphide of lead falling to the bottom of the flask. When finely divided lead is mixed with, its own bulk of sulphur, also in fine powder and the two are heated together, they unite with incandescence, and if the glass tube which contains them is warm, the ignition is continued throughout the whole of the mixture. If oxide of lead is mixed with an excess of sulphur, sulphide of lead is also formed; some of the sulphur in this case taking the oxygen from the lead with formation of sulphurous acid. When in the native state, sulphide of lead forms the very beautiful mineral galena. It crystallizes in cubes, which cleave with the greatest readiness into smaller cubes, and forms a coarse powder which has a beautiful metallic lustre and brilliant reflection, owing to the surfaces of the particles being plane figures. This property of native galena has recently been utilised in ornamentation. Sulphide of lead is also readily prepared in the wet way. When metallic lead is introduced into a solution of an alkaline sulphide, its surface quickly becomes coated with a closely adherent layer of sulphide, which protects the metal from further action. The very useful application of this fact to the prevention of the action of water on lead pipes and cisterns has already been pointed out. When a solution of a lead salt is mixed with a soluble sulphide, a double decomposition takes place; sulphide of lead is precipitated in the form of a dense brown black powder. In this form it is soluble in moderately strong nitric acid and hydrochloric acid, but resists the action of weaker agents; when dry and heated to gentle ignition in the air, the greater part of the sulphur is given off in the form of sulphurous acid, whilst about half the amount of lead is reduced to the metallic state, and the remainder is in the form of sulphate of lead. If sulphide of lead is mixed with oxide of lead, and the two are heated together, the whole of the lead is reduced to the metallic state, the oxygen and sulphur uniting with each other to form sulphurous acid.

Hyposulphite of soda added to a solution of nitrate of lead forms a white precipitate of hyposulphite of lead, which is, however, very instable, blackening below the temperature of boiling water, and becoming reduced to sulphide of lead.

Sulphate of lead is one of the most difficultly soluble salts of this metal. It falls as a white precipitate, when aqueous solutions of a lead salt and a sulphate are mixed together. It is one of the constituents of the protecting crust, which forms upon the surface of lead pipes when common spring water is passed through them. It is almost insoluble in water, requiring twenty-two thousand parts to dissolve it at the ordinary temperature.

Iodide of lead is a very beautiful golden yellow powder, produced by double decomposition; soluble in boiling water, and separating out, on cooling, in the form of golden coloured, six-sided plates.

Chloride of lead is precipitated as a white powder, somewhat resembling chloride of silver, when hydrochloric acid, or a soluble chloride, is added to a lead solution. It differs from the silver salt, however, in being soluble in hot water. In analytical operations, when lead and silver occur together, they are both precipitated by hydrochloric acid, and the two are distinguished by ebullition with water. The lead salt dissolves, whilst the silver salt remains as a precipitate. Upon filtration, the chloride of lead separates from the solution in the form of beautiful crystalline needles. Chloride of lead unites with oxide of lead to form an oxychloride. This is a white insoluble powder, which is now manufactured on an enormous scale, for the purpose of superseding white lead (carbonate of lead). The chemical process employed is one of the most ingeneous and beautiful in the whole range of manufacturing industry, and is carried out on an enormous scale at the Washington chemical works, near Newcastle. The maker starts with the common lead ore, galena; this is crushed, and heated with hydrochloric acid, whereby hydrosulphuric acid is given off, and chloride of lead formed. The solution is kept hot, and is mixed with lime water in such a proportion that the free acid is saturated, and all the iron and similar impurities are precipitated, whilst the whole of the chloride of lead remains in solution. The solution of chloride of lead is then carried along a pipe pierced along one side with an immense number of holes, so that the liquid jets out along the whole length of the pipe in the form of a fluid comb. Parallel to this pipe is another, similarly pierced with holes, through which lime water issues. The two series of jets thus spirt into one another, and meeting midway between the two pipes, unite and precipitate oxychloride of lead, which falls into a trough placed below, and is carried away to large vats, where it is allowed to settle, and is afterwards washed and dried. The success of this process depends upon the accurate adjustment of the proportions of lime and chloride of lead present. The former must be in exactly the proper quantity to precipitate half the lead only, which then unites with the remaining half of chloride of lead, and forms the double compound. It would be difficult to produce this compound in a state of purity by operating in any other manner than the above. Were the lime water to be poured into the lead, the first portions which were added would meet with a large excess of lead chloride, and a different compound would be formed; whilst, on the other hand, if the chloride of lead were poured into the lime water, the first portions, meeting with so great an excess of lime, would have nearly the whole of the chlorine removed, with formation of oxide of lead. Photographers who remember the old days of hypo and gold toning will recollect a parallel case to this upon mixing hyposulphite of soda with chloride of gold. The immense quantity of sulphuretted hydrogen evolved during the action of the hydrochloric acid on the sulphide of lead proved, at the commencement of this manufacture a source of serious inconvenience, the highest chimneys being insufficient to diffuse the gas in the atmosphere. The gas is now passed into a mixture of water and sulphurous acid, formed by the combustion of iron pyrites. The oxygen of the one unites with the hydrogen of the other, forming water and sulphur. A small quantity of pentathionic acid is also formed. This is converted into sulphate of magnesia by the oxidation, in the air, of pentathionate of magnesia.

Nitrate of lead is one of the most useful of the soluble salts of this metal. It is prepared by dissolving the metal, or its oxide, in nitric acid, and evaporating to the crystallizing point. It then forms white crystals, having somewhat of a waxy lustre. It dissolves in about two parts of cold water, producing a great diminution of temperature. It is insoluble in nitric acid.

The chromates of lead are amongst the most beautiful pigments which the artist possesses, but, unfortunately, the tendency of all lead compounds to blacken greatly detracts from their value. By adding a neutral solution of nitrate of lead to a solution of yellow chromate of potash, containing a little excess of potash, and heating, a dichromate is formed of a reddish colour. If nitrate of lead and bichromate of potash are mixed together, a beautiful yellow precipitate is formed, which is generally known as *chrome yellow*. Different shades of chrome yellow can be obtained by varying the temperature of the liquids, and the amount of free acid present. Chrome yellow is also formed if white lead is placed in contact with an aqueous solution of chromate or bichromate of potash. When boiled with an

aqueous solution of carbonate of potash, chrome yellow becomes cinnabar red, and afterwards gets paler, until it is yellowish white. All the chromates of lead are insoluble in water.

THE MANAGEMENT OF SITTERS.

BY DAVID DUNCAN.

It is, no doubt, presumptuous on my part to attempt to teach what has already been taught before by such able photographers as M. Disderi * and others; but I think that the subject still receives too little attention from many operators, skilful though they may be in the dark room. I have seen clever manipulators, and good chemists withal, entirely out of their element in the studio; they have gone about posing the sitter nervously, and have been fidgetty in the extreme, hovering here, and dodging there, working the sitter into a state of mind and body, in which he was utterly unable to keep still, to say nothing of retaining control over the expression.

Moreover, photographers' assistants sometimes get themselves into disgrace with their sitters, from no other cause but want of management. I have known them styled insolent, &c., because they would not allow the sitter to retain an ungainly position, but had not the tact to secure the right position, without irritating the sitter. Of course, I do not say that such occurs every day, or with every operator, but none will deny that such is sometimes the case, and that some sitters are almost insupportable, and will persist in placing themselves in a most inartistic position. Will not a corpulent lady or gentleman persist in sitting direct facing the lens, simply because he or she desires to be taken "full face"? and if you have light only on one side of your studio, will not some people, with blue eyes, insist on being taken facing the light, and look indignant, because you cannot permit them to be so taken? And does it not sometimes happen, that an affected young man, or old maid, will persist in holding a white handkerchief in a most affected and ridiculous manner? because "books are so very formal." I have met with such, and earnestly entreated them to put their handkerchiefs in their pockets, and the moment I have put my head under the focussing cloth, I have seen the hand steal towards the pocket, and the offensive mass of white has again been held in the hand in a furtive manner, the surreptitious act often giving an unpleasant expression to the face, as might be expected. I may go further, and state that some persons, who perhaps have come for their second or third re-sitting, will persist in such things, and will keep moving in every plate you expose. This will most frequently happen when you have several sitters waiting, and thus make you terribly behind hand with your appointments. Well, perhaps some photographer would say, "When I meet with such sitters as the above, I first take them their way, and next request them to sit mine, and then show them the difference." It is a very good plan, but not always convenient, especially if you are busy. I am not going to attempt to give advice, yet I say, use a little management with your sitter: perhaps attention might be given to the following.

Immediately a sitter enters the studio, begin to place him or her in position; have the plate so far in advance that you can do so; at any rate do not keep the sitter waiting. Think at once of the position, whether a sitting or standing position is best suited to them; go about posing them in an easy and gentlemanly manner; if they are talkative, talk to them, working the while; do not bustle about in placing accessories, and avoid walking to and from the sitter as much as possible, in short, work as easy and as *quickly* as you can.

Should a lady or gentleman be awkward in getting in the position you desire, show them by placing yourself in position, in an unhesitating or nervous manner. Nothing is worse than "screwing" round the sitter's head, or "moulding them, as it were, into a good *pose*, albeit you must have command over your sitters to a certain extent. In fact, as Lord Chesterfield wrote, unite "gentleness of manners with firmness of head."

It is always as well, when convenient, to show the negative as recommended in "Hints on the Management of a Photographer's Business;" *vide* the last Photographic News Almanac. In conclusion, I think that photographic portraiture requires a peculiar amount of tact, somewhat different to other businesses, and the management of the sitter is better imagined than described; but if a little attention is given to that point, it will materially facilitate business, and photographers' assistants will have the satisfaction sometimes accorded the writer, of a lady or gentleman, on leaving the studio, saying, "Good morning, sir; I thank you for your courtesy."

* *Vide* Photographic News, vol. vii, p. 330, 343, 353.

A NEW DARK TENT.

BY N. L. NOVERRE.

For photographing subjects by the wet collodion process, out of doors, some contrivance is necessary that the plates may be prepared and developed without white light having access to them. For this purpose various forms of tents and developing boxes have been devised from time to time. These may be placed under three different heads, viz., tents, the cover of which is made of some cotton fabric, provided with a window and table, and inside which the operator stands. This is the most efficient form of tent and open to fewer objections than any other.

Another kind is that in which a box is fixed on to a tripod stand or some other support, the head and shoulders of the operator being enveloped by a cloth cover which is attached to the box and kept distended above the head by iron rods fixed into the box, the chemicals and apparatus being intended to pack in the inside. An objection to this kind of tent is that, as generally made, the boxes are too slight to stand knocking about in railway travelling, &c., without getting broken, in addition to which they are awkward to carry and too heavy for one man when packed full of apparatus; if made sufficiently strong to bear being knocked about in a railway journey and on board ship, the weight would, of course, be much increased, added to which this kind of tent is not so cool to work in as the latter, on account of the cover being wrapped or tied round the body.

The third kind of contrivance is the developing box, which consists of a closed box with holes through which the hands are passed to the inside, the arrangement being fixed on a tripod stand. There is a window at the top through which the operator looks when preparing his plate, and another window in front to admit yellow light to work by. These boxes are only fit for manipulating small plates, and even for these an inexperienced person will find it difficult to tell the exact moment to stop the development, as the plates cannot be held directly between the eye and the light.

The tent about to be described is of the kind first mentioned. It can be made any size, but the size given is large enough to work any plates up to 12 in. × 10. Its construction is simple, it is very easy to put up, cannot be blown over, and there is plenty of elbow room and table space. The construction of the framework can be seen by reference to the annexed diagram. The three upright poles, which are placed in the form of an equilateral triangle and jointed in the middle, for convenience in packing, and the different pieces are held together by strong metal screws and bolts. The height of the tent is 6 feet 1 inch: the distance from pole to pole in the centre, where the table is fixed, is 3 feet. The poles are sloped inwards at the top, and outwards at the bottom, to the extent of 3 inches each way. This form makes the tent very secure against the chance of being blown over. The ends of the poles are spiked like the end

of a tripod stand, that they may be pushed into the ground, and the tent is further secured by a cord from the top of each pole tied to a peg driven into the ground.* The table



is 3 feet long in front and 1½ foot wide, two of the corners being rounded off.

The cover is made of two thicknesses of stout black cotton twill; owing to the framework being smaller at the top than it is below, no difficulty will be found in putting on the cover. Yellow light is admitted through an orange tammy curtain, which runs on rings between the two thicknesses of the cover; this is so managed that it may be drawn back to admit white light, while coating the plate with collodion, and during the operation of development. In addition to the tammy curtain, there are three others of the same material, which can be let down or hooked up at pleasure, so that three different degrees of light can be obtained. A contrivance is made for looping up the cover out of the way at the entrance, so that the operator may pass in and out without inconvenience. There are no holes in the top of the cover for the poles to pass through, as it rests on the fly bolts, and is tied round them by the cords of the tent.

Inside the cover are pockets as follows: one on the left hand side for cloths, one small one on the right hand for the dusting brush, and one for blotting paper. In front, and under the window, are a row of pockets for the bottle stoppers. The bath is secured to the cross piece on the right or left, according to the fancy of the operator, by brass hooks, and a plate box is attached in a similar manner on the opposite side. In place of the metal fastenings, calico bags may be used, made to fit the bath and plate box; they are attached to the cross pieces, and a wide web or strap fixed to them passes under the baths, and is secured to the cross piece at the top of the tent, by altering the length of which the bath can be placed at any angle that may be desired. An india-rubber water-bottle, to hold a gallon of water, is suspended from the top, and hangs against the front pole of the tent; it is furnished with a flexible tube and brass dip.

The sink is made of stout india-rubber cloth and mahogany sides, made to take to pieces and fold up; it is furnished with a tube to carry the waste water off outside the tent, and is so constructed that the bottom of it does not rest on the table, the bottom gradually sloping down from the edges to the waste pipe, thus carrying off the water at once, which is not the case with the ordinary form, in which the sides are straight, and the bottom is flat on the table. There is a slot in the table to allow of the sink being shifted to whichever side the operator may prefer. A support is fixed to the table at the further left hand corner, for the dark slide, and for draining the plates there is a board about five inches wide, which is laid across the dish, after the plate is put in the bath, the blotting paper being placed on it; after the plate has been drained and placed in the slide the blotting paper is returned to its pocket, the board removed from the dish and allowed to hang down under the table by a cord. On the table ample space will be found for the following requisites: four 16-ounce square case bottles, for solutions, behind the sink, the pneumatic plateholder and the bath cover on the left, and four developing cups and the nitrate of silver dropping bottle on the right. The collodion bottle may be placed on either side of the sink, as may be found most convenient.

According to a suggestion from Mr. G. Wharton Simpson, holes are made in the table to let the bottles and developing glasses drop through a few inches, that they may not get knocked down off the table; square case bottles, which are generally most convenient for packing, are wider at the top than at the bottom, as also the ordinary form of developing cup, so that there is no difficulty in the arrangement. The framework and fittings of the tent roll up in the cover, and pack in a waterproof case. It may be remarked that this form of tent is cheaper to construct, lighter, and more easily erected than any other, affording a similar amount of space and convenience. It is made by Mr. F. Meagher, of Clerkenwell, and may be seen at his manufactory.

N. L. Noverre.

25, *South Street, Park Lane,*

* The cords are omitted in the diagram.

SUBSTITUTION OF A BATH OF OXY-ETHYLATE OF SILVER FOR THE NITRATE OF SILVER BATH.

BY M. FRANCISCO DE SELGAS.

We can advantageously replace nitrate of silver by the oxy-ethylate of the same base; the latter is more sensitive to light, it dries quicker, and the negative is less exposed to stains. This product is one-third the price of nitrate of silver, and is employed in the same proportions.

With moist collodion the exposure in the camera will be one-third less than if a nitrate bath were employed for sensitizing; but with the new bath we must employ a slightly iodized collodion: 8 parts of iodide to 1,000 of collodion will suffice.

To develop the picture, whether we operate with wet collodion or dry, he plate must be immersed in a developing solution composed as follows:—

Distilled water	100 parts
Gallic acid	1 part.

When the picture appears in all its detail, withdraw it from the bath and carefully wash it under a stream of pure water. The negative may be strengthened by pouring over it a little of the developing solution to which some of the oxy-ethylate solution is added, and taking care not to proceed with the mixture until it is required for use. The following are the proportions:—

Gallic acid solution	50 parts
Oxy-ethylate solution of 2 per cent.	3 „

The strengthening and fixing are performed in the following manner.

If, after fixing, it happens that a white or grey veil is seen to cover the picture to cause it to disappear, it will suffice to pour over the surface of the collodion a little of the following solution:—

Filtered rain water	12 parts
Nitric acid	18 „

The veil will immediately disappear and the picture resume all its original purity.

To obtain a good negative with dry collodion, the plate must be carefully washed upon being removed from the oxy-ethylate sensitizing bath, and then dried. Thus prepared, it will be kept ready for use during several months on condition of being protected from the light and dust, by putting the plates in a grooved zinc or mahogany box. The plates increase in sensitiveness for several days after they are prepared.

To develop the picture, immerse the plate after removing it from the camera in a dish containing an oxy-ethylate bath of 5 per cent. strength, and immediately withdraw it; allow the excess of the sensitizing bath to drain off, and then pour a little of the developing solution with gallic acid over the plate. The development takes place slowly, but there is no fear of stains. The older the oxy-ethylate bath the better it is. When a new bath is prepared it is necessary to render it old by adding to it 25 per cent. of the oldest silver bath possible.

The bath of oxy-ethylate of silver is maintained at the same strength by replacing the quantity withdrawn by use by an equal quantity of a 10 per cent. solution kept ready for the purpose in a bottle.

Albumen for the paper intended to be sensitized with the oxy-ethylate of silver.

Chloride of ammonium or of barium	25 parts
Sulphate of copper	3 „
Chloride of gold	1 part
Distilled water	200 parts
Albumen	800 „

To sensitize the paper prepared with the above, float it for ten minutes upon

Distilled water	300 parts
Oxy-ethylate of silver	60 „

When this bath has sensitized nearly the same number of sheets of paper as can be done with a nitrate bath of 20 per cent. strength, 1 per cent. of nitrate of silver must be added to the sensitizing bath, and it will then recover its energy as though it had been newly prepared.

Printing is effected much more rapidly than with nitrated paper; toning, fixing and washing, may be performed according to the method preferred by the operator.—*El Eco de la Fotografia, Cadiz.*

BROMO-IODIDE SALT, FOR SENSITIZING COLLODION.

BY M. JULIET.

The following is the mode of preparing a bromo-iodide salt for making a rapid collodion, one that will keep a long time, together with the manner of employing it, which has afforded the best results.

Put into a porcelain capsule

Iodide of cadmium	3 drachms.
Bromide of cadmium	1 drachm.

Pour upon these salts from 4 to 5 drachms of pure aqua ammonia, rather more than less. Heat the mixture over an alcohol lamp; under the influence of the heat the salts of cadmium dissolve in the ammonia; by continuing the heat, the ammonia in excess, which has not entered into combination, evaporates, and the liquid finally crystallizes. The crystals can be used in this state, but it is preferable for the conservation of the salt and the collodion also, to fuse the crystals, as is done with nitrate of silver.

The product is a double salt of cadmium and ammonium, which keeps a long while unchanged, if preserved in a well corked bottle.

The following is the best formula I have found for collodion:—

Alcohol	500 parts.
Ether	500 „
Cotton	9 „
Double bromo-iodide salt ...	12 „

Care must be taken to dissolve the salt in one-half of the alcohol employed for the collodion, the day previously at least; for the salt dissolves very slowly. Filter the solution and add it to the plain collodion.

In case the collodion becomes quite colourless in the course of a few days, a few drops of a concentrated alcoholic solution of iodine must be added to it; or better, some particles of iodine, so as to produce a bright yellow colour.

Sensitizing Bath:—

Nitrate of silver	12 parts.
Water	100 „
Nitric acid, pure	1 „

Saturate the bath by adding to it a little of the alcoholic solution of the double salt.

The plate remains in the bath from five to six minutes.

I have developed with formic acid, according to M. Claudet's formula, with good results as to rapidity, but I have been compelled to give up this mode of developing on account of the little dependence to be placed on the quality of the formic acid sold.

The best results I have obtained were given by the following formula:—

Water	100 parts.
Ammoniacal sulphate of iron ...	2 „
Acetic acid	3 „
Alcohol	2 „

The rest of the manipulation is exactly the same as in ordinary processes.—*Le Moniteur de la Photographie.*

Proceedings of Societies.

London Photographic Society.

The usual monthly meeting of this society was held on the evening of Tuesday, April 5th, in King's College, Mr. Francis Bedford in the Chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. T. M. Browrigg, Silas Eastham, S. Skaife, and Frank M. Good.

Mr. Shadbolt called attention to the doubtful legality of the council creating "honorary members" of the Society as announced in the regulations for exhibiting. After some conversation it was resolved that the term "members of the exhibition" should be used instead, the arrangement referred to remaining intact with this modification in terms.

The Secretary called attention to some photographs recently taken by Mr. Brothers by means of the magnesium light, and announced that at a future meeting Mr. Sydney Smyth would take a solar camera picture before the members by means of this light.

The Chairman called attention to some very fine examples of Willème's photo-sculpture, one of which was a statuette of M. Blanquart Evrard.

M. Claudet briefly described the method of producing them, remarking that the process was described in the Photographic News. (See vol. vii. p. 338, and several articles in a former volume.)

The Chairman called attention to a fine enamel portrait of the Lord Chief Baron, by the process of M. Camarsac, the portrait being published by M. Marion.

The Secretary read a letter from Mr. Ross, calling attention to some fine specimens of Messrs. Helsby's process on opal glass.

The Secretary called attention to some of Mr. Cooper's charming specimens of double printing. He also called attention to a carbon print by Mr. Firling which had been produced by three minutes' exposure.

The Chairman called attention to two pictures sent by Dr. Watson to ask the opinion of members as to what process the duplicate of the photograph had been produced by.

The Chairman announced that M. Laulerie, of the French Photographic Society, would be happy to receive pictures for the Exhibition from English photographers.

The Secretary called attention to some specimens of solar camera enlargement by Mr. Aldis.

Mr. Swan then read his paper on "A New Method of Carbon Printing," and exhibited a number of very fine specimens, from card size to 10 by 8, including portraits, landscapes, and sea views. He also exhibited some examples of the tissue employed, and also some transferred negatives referred to in his paper. Mr. Swan's communication was received with much applause, and the specimens excited much admiration.

The Chairman, in proposing a voto of thanks to Mr. Swan, remarked that there could be no question as to the beauty of the specimens exhibited. They were as perfect as photographs could be, and possessed every quality which could be required.

Mr. Thomas asked Mr. Swan what he claimed as original in his process.

Mr. Swan thought that his process possessed several very novel points. To mention one specifically, however, he might point to the fact, that he discarded both paper and glass as a support for the sensitive gelatine, and formed a new tissue on which to produce his picture. He did not pretend to know all that had been done, but to the best of his knowledge, no such tissue had ever been used before. There were several other points which were, he believed, novel.

Mr. Thomas said that Mr. Burnett had alluded to the use of sheets of gelatine, some years ago, in the 5th volume of the *Photographic Journal*. It was important to know definitely what was the basis of the patent; for his part he thought patents obstructive to the progress of photography.

Mr. Swan said if Mr. Burnett suggested the use of sheets of gelatine only, they would not answer the purpose, without something to support them. The support of the collodion was quite essential. He had not seen Mr. Burnett's paper, but a general suggestion, without particulars or practical instructions, would not be of much service, or in any way affect the method.

The Chairman said, that there could not be a moment's doubt that Mr. Swan had produced specimens such as had never been shown before, and which possessed as well the valuable property of absolute permanency. (Applause.) The only point of regret was, that he was obliged to withhold the working details.

Mr. Swan said he had given full working instructions, withholding no detail, but describing every step in producing the specimens on the table; he had not entered into details of further experiments since made, and not affecting the principle; but he had exactly described every step in producing the specimens before them.

Mr. Sebastian Davis would be glad to know a few more particulars as to the method of producing the sheets of tissue, as to the charactor of the collodion, and the mode of combining the two.

Mr. Swan said ordinary uniodized collodion was used, and he could best answer as to the method by reading again the paragraph in his paper describing his operations.

Col. Stuart Wortley asked if there were any peculiarity in the gelatine, and what was its price.

Mr. Swan said it was ordinary gelatine, he had only used one sample, but could not state the price.

Mr. Davis remarked that the tissue consisted, he presumed, chiefly of gelatine.

Mr. Swan said yes.

Mr. Seeley said he presumed that the purpose of the collodion was to enable the gelatine to be stripped from the glass.

Mr. Swan said that was not its only purpose, as he had explained.

Mr. Shadbolt said if he had rightly apprehended the matter, collodion was the very basis of operations, and without it the gelatine would fall to pieces.

Mr. Swan said this was so.

The Chairman presumed that if there were no collodion the lights of the finished picture would be a series of holes.

Mr. Swan said undoubtedly.

Col. Stuart Wortley asked what advantage collodion had over paper for the purpose.

Mr. Swan.—Its superior transparency and thinness made all the difference between good and bad results.

Col. Stuart Wortley asked some further questions on points of manipulation he had not quite understood, which Mr. Swan explained.

Mr. Hennah said it appeared that the pictures must be reversed.

Mr. Swan pointed out amongst his specimens, some of which were reversed and some which were not so, to show that no such necessity existed. He referred to the method described for reversing them, and also to the methods he had described for reversing the negative.

Dr. Diamond referred to Mr. Archer's patent for transferring the film with gutta-percha, &c.

Mr. Swan said that further experience had not confirmed the idea at one time entertained of the value of gutta-percha, as it was apt to oxidize and become brittle. The best method was, he thought, with gelatine, as the negatives he now exhibited illustrated. Gelatine was poured over the collodion film, allowed to set, and then varnished with a good varnish. It was then easily removed from the glass, and answered every purpose better than on the glass.

Mr. Davis said that the process requiring only one-third of the exposure of albumenized paper was equally important and singular. All such processes, hitherto, had required very long exposure. He wished to know whether the collodion film in any way affected the sensitiveness, or to what it was due.

Mr. Swan had not made experiments to ascertain certainly to what the especial sensitiveness was due; but he thought it most probably due to the use of a large proportion of sugar in the gelatine.

Mr. Davis asked if grape sugar or ordinary sugar were used.

Mr. Swan said ordinary white sugar.

A Member asked if Mr. Swan had ascertained whether the image could be transferred to stone or metal with a view to being printed at the printing process.

Mr. Swan said this process was not placed in competition with any of the printing-press processes, but rather as the analogue of the silver printing process. He had made some experiments in its application to engraving, but was not prepared at present to enter into details. He had not tried it upon stone. He did not think it probable that upon stone, or upon blocks in relief, half-tone would ever be obtained. On engraved plates, for printing at the copper-plate press, he had considerable hope of securing a successful issue as regarded half-tone. It was possible that the method he had been describing might be used in Col. James's process, as a means of transfer.

Mr. Seeley asked if the gelatine should dry spontaneously or by heat.

Mr. Swan said it was quite unimportant.

Mr. Seeley wished to know if ordinary negatives would still be useful, and how with various negatives the printing was to be timed.

Mr. Swan said that negatives might easily be classified and different classes printed together, so that by examining one, the progress of all might be determined.

Mr. Seeley said that he noticed one of the prints had a tendency to leave the mount; was this from defective mounting?

Mr. Swan said very likely the mounting might be defective.

Mr. Tunny (of Edinburgh) said he was not a member of the society, but, as an old photographer, he might be permitted to say a few words. He was sure that every old photographer would hail this new process with great gratitude. For his own part, he was perfectly overjoyed to find a carbon process give results equal to silver prints, and he thought it quite out of place to cavil about the details of a process which already presented such beautiful results; and if metallic pigments could be introduced with the same facility as carbon, he saw at once the method by which enamels like the beautiful productions of Camarsac could be produced. He had been struck with the fact at once on hearing the details, and he had little doubt but that Camarsac's pictures were really produced by a similar process. He hailed with delight the advent of the only process which hitherto seemed to meet every requirement.

Mr. Swan said that metallic pigments could be introduced, and, in fact, the whole of the pigments used by the painter, giving a range of tint hitherto quite out of the reach of the photographer. He had not overlooked the possibility of applying the process suitably modified to the decoration of glass and porcelain, and similar purposes, where a burnt-in, or enamel process, was necessary. He here would take occasion to mention and thank the gentlemen who had lent him negatives; the large pictures, and the sea views were from negatives by Mr. Wilson, some of the portraits from negatives by Mr. Piper, of Newcastle, some from Mr. Heaviside, of Durham, and the portrait of Mr. Hardwich, and that of Mr. Henneman, from a negative of Mr. St. George.

Mr. Shadbolt said he thought it important to remark that he thought Mr Tunny was in error in supposing this process the basis of Camarsac's, which had been published four or five years ago. If it were the same as Mr. Swan's there would be an end of the patent, but it was clear that Mr. Tunny was in error, he thought.

Mr. Tunny said he was in M. Camarsac's atelier three days ago, and that gentleman informed him that not a soul knew anything of this process but himself.

Mr. Wharton Simpson said that Mr. Shadbolt was perfectly correct in stating that some years ago a paper was published by M. Camarsac, purporting to explain his process; but as it had the singular merit of not explaining a single fact or detail,

the reader had learnt nothing when he had read it, and, therefore, Mr. Tunny was also right in saying that no one knew anything about it.

The Chairman said Mr. Greenwood had requested him to call the attention of photographers to the Fair of the Sanitary Commission, to be held in America, to which photographic contributions would be acceptable. (See p. 171)

Mr. How exhibited and explained the advantages of a very convenient tent for working photography in the field. It was easily erected and easily packed, convenient to work, and well ventilated. Plates up to 10 × 8 or 12 × 10 could easily be worked in it. The weight was from 18lbs. to 20lbs.

Colonel Stuart Wortley thought it was very similar to Edwards' Registered Model Tent.

Mr. Rouch thought it quite the same.

Mr. How believed not, but it was a point for the members and the public to decide.

The Chairman announced that at the next meeting Mr. Skaife would explain some improvements in his pistolgraph, and Mr. Hennah would describe his process of printing.

The proceedings then terminated.

Correspondence.

A PHOTOGRAPHERS' RELIEF FUND.—"CHEAPNESS" IN PHOTOGRAPHY.

Sir,—You invite remarks upon two subjects in your last, namely, a "Provident Fund" and the question of "Cheapness." The former one ought to be looked at in such a manner as to exclude from sight the idea of charity or benevolence, and modes of action recommended to induce self-dependence.

A being truly manly will use all means society allows that he should not become the object of charity, which, except in rare cases, degrades the recipient.

As to the question of "Cheapness," I believe the only remedy lies in the higher cultivation of the art. If portraits can be made by photography as music, of *a kind*, can be squeezed from a barrel-organ, then nothing can prevent them being made, of *a sort*, for a few coppers each.

But, as I find many years of experience not too much to enable me to make portraits that will bear refined criticism, I, therefore, do not believe that photography of a high order can become, in the common sense, cheap.

When I think of the chemical skill necessary to clean and tasteful manipulation, the large knowledge of light, and its proper distribution upon the object, necessary to fine modelling, a perception of artistic law, in order to give chaste effects; a *general* knowledge, in order to be conversant and acquainted with every one; a keen perception of human form, in order to select the finer views of the object; and, above all, the tact of making all classes, old and young, feel at home with you. Now, I think the above qualification necessary to successful practice (not commercially) in a high and purely artistic sense.

Now, as I conceive the qualifications of a photographer should be somewhat high, I should propose that an institution should be formed to combine the idea of a provident fund and photographic college, similar to the institutions or colleges of surgeons and dentists—an institution in which all candidates would have to undergo an examination for membership; that it should have provincial branches and properly elected examiners, who could give certificates of fellowship to members. Thus a line would be drawn between the mindless and the intelligent artist.

The above suggestion, if worthy of a place in the News, may lead to something actual in the matter.—I am, sir, yours, respectfully,

John Beattie.

THE NEW PHOTOLITHOGRAPHIC PROCESS.

Sir,—Your excellent Journal has recently given a description of a process of etching, by M. Vial, of Paris, as delivered before the Society of Arts. I had hoped that some statistical critic of patent specifications would have discovered that the same process has been patented by me, No. 1936-61; and thus save me the necessity of asserting my own claims; but this is not the only instance in which the claims of my invention have been reinvented; however, I shall leave these for another occasion, as I am anxious to call your attention to my article of 28th August, last year (No. 260), on a "New Transfer Process," from which you will see that I have been the first to discover the transfer process referred to, in last week's News, and patented by M. Toovey, of Brussels. It is an unfortunate fact that inventors plunge into patent expenses, without giving the proper attention to search the records, to discover what has already been accomplished. The following is an extract from the article referred to.

"I form a jelly, consisting of four ounces water, one ounce gelatine, one-eighth of glycerine and bichromate, to saturation, at a temperature of 80°. These are put into a glue-pot, and heat applied to dissolve carefully, filter and spread on glass plates; then allowed to stiffen, till the surface will not adhere to the dry finger, or to the negative plate, when pressed against it. If the upper surface be not smooth, I reverse the film upon another plate, or water-proofed cardboard; upon this I place the negative, and expose for a few minutes, according to light; then withdraw to the dark, the *exposed surface* is to be laid on a clean lithographic stone, and a very gentle pressure applied simultaneously on every part, to ensure success. Some dexterity is required in laying down, and quickly taking up the gelatine sheet, circumstances regulating the degree of pressure, and the time it should remain in contact with the stone. This being accomplished, the stone is smeared with re-transfer ink, or printing ink, and washed off with turpentine and gum water; then inked up in the usual manner. A positive transfer will be the result, ready for printing. The same exposed surface may be placed on several stones, and yields a number of good transfers by a single exposure."

On comparing the above with the process described by Mr. Toovey, it will be seen that I reject gum arabic, as I found it had not the *body* in it; being too soluble and liable to spread, when brought into the slightest contact with the stone.

The process above described, and that in my article, No. 259 of the News, for August 21, '63, are exceedingly valuable, and bid fair to supersede all other processes based on *single* exposure. I hope, on an early day, to lay before you my "automaton register" for photographic purposes; by aid of which I can *repeat* the operations of exposure and coatings on the paper, stone, or plate, until I secure perfect results.—Respectfully your obedient servant,

Joseph Lewis.

29, *Dame Street, Dublin, April* 4, 1864.

THE MEDALS AT THE FORTHCOMING EXHIBITION.

Sir,—The letter writer in the *British Journal*, a writer who, if I might say it without offence, has as many *aliases* as a pickpocket, has written an epistle full of notes of admiration, containing little logic, and less wit, although there are great attempts at both, and with, as usual, a plentiful supply of quotations from Ruskin and Hammersley, imparting a spirit of partizanship to your very sensible remarks on the medals offered by the Photographic Society of London. In doing this he has carefully avoided the chief point in your argument, viz., the omission of a medal for reproduction, to which class I agree with you in considering the photographing of buildings, essentially works of art, belongs, indeed he himself calls them "frozen music," and "poems in stone," and the copying or reproducing of buildings cannot otherwise be classed, than with the reproduction of other works of art, but which reproductions are, unjustly in my opinion, excluded from competition. In speaking of the medal

for composition photographs, he says that there is no hardship in the regulation stipulating that the competing pictures must be from *one* negative, as *all* the competitors are subject to the same condition. Surely, it would be the same if more than one negative were allowed, so that argument falls to the ground, but he unintentionally strengthens your arguments, by saying that double-printing, *except in the most skilful hands* (the italics are his own), degenerates into botch-work. It therefore follows, according to his peculiar logic, that the most skilful hands must go unrewarded, and the unskilful, because there are many of them, must obtain the medals. From his recommendation to you to take a six months' tour for the purpose of photographing architecture, to "get your living by it," I imagine this letter-writer considers the greatest photographic success to be that which makes the most money, probably because he has not been able to succeed himself. I ask him, "Am I right?" but commercial success and the success which goes towards raising photography to the rank of a fine art are different things; and although the Council have blundered, I still think they have more thought to the latter than the former.

His remarks on the "unity of idea," &c., are simply exercises in the jargon or art of which he is well known to be a master; pity that such a mastery over terms does not teach him a knowledge of the subject on which he writes.

Both Sides.

[We are not surprised that the writer in question should add one more to his many *aliases* in this instance, in which he writes an article the authorship of which he would be ashamed to confess in his proper person. But the speciality of style, the mixture of slang and colloquial familiarity; the factitious force of italics, inverted commas, and notes of exclamation; the rhapsodical affectation of a mystic knowledge of, and reverence for, art; the transparent slenderness of his photographic knowledge; the iterated quotation of Ruskin, in season and out of season, which reminds one of the inability of poor crazy Mr. Dick, in "David Copperfield," to keep King Charles the First out of his memorial—all combine to place the authorship of the article beyond question, and, therefore, to render its argument and objurgation alike of little importance. It is the old story of "No case, abuse the other side." The signature is funnily suggestive of how a person may "look at both sides" and see or understand very little of either. As we began the remarks he abuses by expressly acknowledging the beauty and importance of good architectural photography, we are not concerned to answer his rhapsody on the subject. As we never contrasted the manipulatory difficulties of taking card pictures with those of architectural work, his transports on that subject have no meaning. As for sowing "the seeds of discord between two classes," unless one person is to "divide himself and go to buffets," the remark is sheer nonsense, as we do not know an instance of the highest excellence in one branch that is not also distinguished by excellence in other branches besides. There are no finer architectural photographs than Bedford's, but his landscapes are equally beautiful. Mr. Wilson, Mr. England, and Mr. Blanchard are alike distinguished in instantaneous photography, landscape, portraiture, and architecture. Mr. Robinson has taken medals in three classes—portraiture, composition, and landscape—and his architectural photographs are no less perfect than his others. But we should willingly abide by the verdict of these gentlemen, as to which class of pictures makes the greatest demand upon their abilities. Has this gentleman any notion of sowing discord between classes when he sneers sillily at the skill required for taking a card picture, as compared with field work on larger plates? Since he suggests a six months' trial at architectural photography and "getting a living by it," as a test at once of the difficulty and grandeur of the occupation, let us ask him if a similar trial in portraiture would be a legitimate argument as to its difficulty or greatness. *Verbum sap.*—Ed.]

PERMANENT PRINTING PROCESS.

Dear Sir,—The fact is well known, and it has been acknowledged again and again, that all photographs produced by the ordinary silver process, will sooner or later fade away. This was admitted as far back as the foundation of the Duc de Luyne's prize, in the conditions of which it was stated, that carbon or printing ink was the only material that could be relied on for permanency; it being, therefore, most desirable to obtain photographs in the above durable material, our French neighbours have rewarded accordingly those who have worked in this direction, thence it was that Mr. Pouncy obtained, in Paris, a silver medal and 400 francs for his first carbon proofs. From about the same time the Editor of *The Photographic Notes*, who keenly appreciates the importance of a carbon printing process, or a move in that direction, has not ceased to keep the point continually before the world. After numbers of persons had obtained particulars of the process from Mr. Pouncy, and produced by means of it photographs in carbon, the London Photographic Society called a meeting to consider the subject. But although from time to time since the appearance of the first carbon photographs by Mr. Pouncy, others have worked in this direction, yet the Photographic Society of London has never offered any medal, reward, or encouragement of any kind for the production of a photograph on the permanency of which we may rely. Not so with the Photographic Society of Scotland, for amongst the medals offered last year by that body, of which Sir David Brewster is the President, was a medal for the best print in carbon or printing ink, and that medal was awarded to Mr. Pouncy of Dorchester.

Now, although we have heard of late something about a new carbon process by Mr. Swan, whose pictures are pronounced by the Photographic Society "to be equal to silver," still, there is no reward offered for photographs in carbon. Like the gentleman who exclaimed in discussion, "What do we as photographers want with pictures?" So the Photographic Society would seem to indicate by their inaction. "What do we want with permanent photographs? Again, I ask, what is there to induce an enlightened public to go to a photographic exhibition? Can we not see in almost every street, in any one of our large towns as well as in London, every description of photograph, yet it is only amongst the few that we can perceive any advance in the art of permanent photographic printing, so that our friends after us may possess our unfading cartes de visite. Yet, even those few are carefully excluded from the encouragement of the Photographic Society. I must say I feel therefore rather surprised that amongst the number enumerated in your impression of 18th March, whom you consider to have been excluded from the chance of gaining medals, you should have expressed no sympathy for those who are labouring might and main to elevate photography by a method of printing, by which alone the work of photography of this generation can be handed down to the next; let us ask, where can one see any of those photographs taken by Mr. Fenton detailing the scenes of the late Crimean War—those prints which were exhibited at that time? I should be glad to see some of them at the forthcoming Exhibition, and the council would do well to offer a medal for their production there, in order to show the public what they have to expect from any photographs in silver, or what satisfactory evidence exists in proof of their permanency. I think the council might have spared themselves the unnecessary caution exhibited in Rule 4th, viz., that pictures which have already been publicly exhibited will not be received.

I should like much to see that case of photographs that ever was shown at the two exhibitions, surely such a thing has not yet happened, nor is it likely to do so while the method of silver printing continues. It is notorious that many exhibitors removed from the walls their photographs on account of fading, long before the close of

the late International Exhibition, and yet in the full knowledge of this state of things, the London Photographic Society, by their arrangements, exclude all those from sharing its honours who have brought forward a permanent printing process; surely it must be patent to all that so-called honours of so partial a description are utterly worthless, and cannot prove more enduring than the works that form their subjects. H. D.

Weymouth.

[We noticed the omission of any mention of a carbon or permanent printing process, to a gentleman officially connected with the Photographic Society, and he intimated that he believed a power would rest with the jurors of awarding or suggesting the reward of a medal for any permanent printing process of which worthy specimens might be exhibited. We thought it strange that no direct offer of a medal for such a process should be made, but refrained from allusion to the subject in our strictures, as it appeared possible that some recognition of merit in that direction might still be made, whilst in the cases we condemned their appeared evidence of intentional slight.—Ed.]

WARMING THE NITRATE BATH FOR PRINTING.

Dear Sir,—I see, by last week's News, that Mr. Seeley, U.S., recommends hot silver solution for silvering albumenized paper. The enclosed formula we have been using since December, 1862, when I first made the discovery that hot silver solution had the following advantages:—

Saving of time in silvering—saving of time in printing—saving of time in toning—entire absence of mealiness and uniformity of colour in the prints.

I may also mention, that when the bath solutions are once mixed, you require only to keep up the original quantities of the working bath from the stock solution, to keep it in working order.

Should you think the formula worth publishing, you are at perfect liberty to do so. I am only sorry I did not send it you months ago; it was my intention so to do, but the fact is, "Procrastination is the thief of time."—Yours truly,

W. G. Helsby.

34, *Church Street, Liverpool, March* 29, 1864.

HELSBY AND CO.'S FORMULA.

Hot Silver Bath for Albumenized Paper.

Working bath solution.

Nitrate of silver...	4 ounces.
Water	20 „
Absolute alcohol	5 „
Liq. ammonia fortis	4 drops.

Filter.

The porcelain dish containing the silver solution is placed in a tin dish three inches deep, filled with boiling water. Said tin dish to be made so that the porcelain bath may fit into it tightly, and with brackets for its support. Proceed at once to silver your paper, allowing each sheet to remain on the silver solution from 20 to 30 seconds.

To keep the working bath solution in good order, proceed thus:—After use, let it cool, then filter, and make up the original quantity of 25 ounces by the addition of the following stock solution:—Nitrate of silver, 10 ounces; water, 40 ounces; absolute alcohol, 15 ounces; ammonia fortis, 10 drops.

NITRATE OF SODA IN THE PRINTING BATH.

Dear Sir,—In the last number of your journal, April 1st, p. 166, in his letter on "Weak *v* Strong Baths," Mr. Eliot, speaking of the "extraordinary discrepancy" in Mr. Dawson's and others' experiments, asks whether Mr. Dawson's failure may not be due to his "using much too highly salted a paper, and the others' success by their getting hold of a weakly salted sample." In answer to this suggestion, allow me to state that this discrepancy must be due to some *other* cause, for I have always printed upon Saxe and Rive papers which the vendors of them assured me were salted with *ten grains of chloride of ammonium* to the ounce of albumen, and therefore were "highly salted;" but notwithstanding the various samples I have used of both papers, I have *never* had the albumen removed, or its brilliancy of surface diminished by the use of the mixed printing bath of nitrates of silver and soda. In some experiments made jointly with my friend "Publicola," we found that *nitrate of ammonia* employed instead of nitrate of soda, in conjunction with nitrate of silver, removed the albumen from a sample of paper which would retain all its brilliancy of surface when nitrate of soda was thus used. We also found once, and *once only*, that a slip of albumenized paper had the albumen removed by the mixed bath of nitrates of silver and soda, and having thus once seen it removed, I considered it right to state, that this mixed bath would remove the albumen from some samples of paper, because I thought that any person meeting with such a case upon *first* trying the bath, would be apt to be deterred from trying *another* sample of paper. Suppose, however, I had ascertained where this piece of paper came from, procured some of it, and printed specimens upon it from the mixed bath of nitrates of silver and soda, and exhibited them at a photographic society, methinks such a course would have been a much more conclusive proof of my own presumption, than of the "inutility" of the addition of nitrate of soda, for several professional photographers have used no other than this mixed bath for some months, and it is the only one which its "originator" has employed for more than a year; and, moreover, one of these professional photographers alone sends out daily several hundreds of prints from this bath. However, Mr. Dawson has considered it right to do so, for he albumenizes a paper himself, and this albumenized paper possessing the uncommon property of having the albumen removed by the mixed bath of nitrates of silver and soda, he exhibits prints upon it as a proof that he is right in his condemnation of the bath.

Mr. Eliot seems to think, "from the remarks of 'Photographer's Assistant,' and others, that they only succeed with some kinds of paper." I am sure he will pardon me when I state that he would have been more correct if he had said, they *only occasionally fail;* these *few* failures are due to the albumenizer and not to the bath. In a letter which precedes that of Mr. Eliot, Mr. Barrett says, his "bath of ammonia nitrate of 10 grains only to the ounce, used with alcohol, gave very vigorous prints;" this bath "never discoloured, but with some samples of albumenized paper it dissolved the albumen." Methinks Mr. Barrett was too intelligent, and earnest for the dissemination of truth, to condemn this weak ammonia nitrate bath, because he sometimes found it remove the albumen.

Fortunately for science, truth is a sturdy and persevering jade, and though her onward march may often be delayed by her numerous antagonists, foregone conclusion, falsehood, prejudice, &c., &c., it cannot be prevented.—Yours truly,

George Price.

18, *Mornington Road, New Cross Road.*

Photographic Notes and Queries.

Retaining the Specimens of Operators.

Dear Sir,—I see that your "Sufferer" of the 24th ult. has not been listened to or noticed in your last impression.

With your and your readers' permission I shall give him my advice at all events; namely, "never part with your specimens." Do as I do. If they wish to see them, you will be most happy to show them *personally*. Amongst the other risks there is no fear that they would copy either. Some of them, I dare say, when they advertise, never mean to have the operator at all. It is useful to see *what is in the market*, and a nice striking pose might just do nicely for the coming Exhibition and might get a prize at a moderate cost, thus dispensing with expensive operators; 30s. to 40s. *soi disant* operators there are plenty in the

market all the year round with and without character. And since I am come to this quarter I shall indulge little more in it. Indeed, to say the truth, among our class we find very often a good deal of imposition, &c. Specimens are picked up here and there, and tendered impudently as own productions. The worst characters given of former employers (to avoid references), and all sorts of dirty tricks performed, and sometimes, unfortunately, with wonderful success.

Allow me therefore to submit, for the sake of the respectables, that genuine specimens, if needed, should be unmounted, with few words at back signed by respective principals. That strict investigations should be made respecting the moral and true antecedents of assistants. In fact, I may go too far, perhaps, but references ought to be exchanged, for if we may say much about the one, much more we can about the others.—Yours respectfully, A Double Sufferer.

P.S. If "Sufferer" is really an operator, and a good one, he need not be afraid for the want of specimens. A good photographer can always, by few questions, understand whether the applicant is a real operator or an impostor; and, in case of doubt, would surely grant a trial, according to what he wants, for a thorough artistic and scientific man must have larger variety of circumstances to work upon, whilst a mere carte de visite maker can be detected by the first plate; and if a professional photographer cannot see that at once, he had better give up photography and go to preach in the park.

Talk in the Studio.

Solomon's Yellow Varnished Muslin.—Since noticing this substitute for yellow glass in the dark room, we have examined it in the spectroscope. It is a great improvement on most similar productions. One thickness cuts off all the blue rays, but lets through the higher green rays, which would act on a sensitive bromized collodion. Two thicknesses, however, answer admirably, and are quite safe. Photographers using it, must, especially if it be subjected to direct sun-light, give an eye now and then to its condition, so that it may be removed if any fading be apparent. This may, or may not, be the case, time only will determine; but it should have attention.

Magnesium Wire.—We understand that the price we quoted last week for this article, will not be the price by the single foot, but referred to quantities. The price charged will, doubtless, depend much upon the quantity purchased; and when it comes into extensive use, it will probably reach consumers at a less price than that we named.

New Copyright Bill.—On the motion for the second reading of this Bill on Wednesday evening, Mr. Black moved that the order be discharged, for the purpose of enabling him to bring in an improved Bill. The motion was agreed to, and the hon. member then moved for leave to bring in a Bill, entitled a Bill to Consolidate and Amend the Acts relating to Copyrights. This motion was agreed to.

Alcohol in the Developer.—A correspondent says: I am much obliged for the hint given to some correspondents as to *not* using alcohol in the developer. I have not used any lately, and succeed in getting cleaner negatives, free from fog and stains.

Magnesium Light.—At the next meeting of the South London Photographic Society, Mr. F. W. Hart, will take a photograph on a collodion plate by the aid of the magnesium light.

To Correspondents.

G. H. C.—An acetate toning bath may be strengthened from time to time by the use of chloride of gold and acetate of soda in their proper proportions. 2. If the chloride of gold be kept in solution in alcohol, it is probable that you may add carbonate of soda to it for the purpose of neutralizing, without any danger of making it alkaline, or precipitating the gold. This should be so theoretically, but we have not tried it. Acetate of soda is not soluble in alcohol to any extent. 3. The general effect of adding too much alkali is to spoil the toning qualities of the bath, and render it inert. If any toning qualities be left, the colour is not good.

H. B. Y.—We see no reason to doubt the purity of your nitrate of silver; it is quite as likely that the distilled water is at fault. If, however, on adding a few drops of nitric acid to your bath it does not work clean, you had better neutralize and sun it. See articles in our last volume on "Management of the Nitrate Bath," and also in our last Year-Book. Your accessories are very creditable for home manufacture. You had better abandon your gutta-percha bath for one of glass or porcelain; for, whilst pure gutta-percha is safe enough, you are never certain of the purity; and even the purest deteriorates. Possibly the gutta-percha is the cause of your trouble. Bottles which have held the silver solution may be cleaned either with cyanide or nitric acid.

Charles Anstruther.—The indistinctness of the mass, which should be bushes, arises from a little under-exposure. The strength of the bichloride solution is not important—a strong solution acting rapidly, and a weak one slowly; but it would be more convenient to use it one-fourth of the strength you mention.

One of Them.—You mistake our motive for not inserting your letter. It was even in type, and intended for insertion; but a reconsideration of the case determined its rejection, as we did not consider its suggestions sufficiently valuable to occupy a column of space. We know nothing of the gentleman to whom you referred, nor did we make any inquiry on the subject; at present, therefore, we have only your version of the subject. The personal question is, however, of no importance to us whatever. The closing sentence in our former answer had reference to another transaction, in which our recommendation to a teacher was abused. Regarding the general question of the rights of operators, it will always receive the fullest justice from us.

M. A. O.—We have not published a list of names for the Exchange Club yet. Yours was received and acknowledged in general terms amongst "Several applications" for membership.

W. H. T.—You will not, of course, be able to estimate the amount of silver in a solution by means of its specific gravity, when nitrate of soda is present. The only plan will be to test it by precipitatiug a small quantity by means of a standard solution of chloride of sodium. Mr. Hart's apparatus for that purpose is the most convenient we know. If you are using the bath regularly, a few experiments will enable you to estimate the loss of silver for each sheet floated, and then you will only need to calculate, instead of precipitating silver. You will not need to add fresh nitrate of soda, we believe, but we are uncertain. We are glad you find advantage from its use.

Diogenes.—The especial advantages of the triple lens over a single lens are, that it is free from distortion, giving upright lines quite straight; that it covers a wider angle of view, and defines well with a larger aperture. We prefer No. 3, decidedly. 2. The chemical difference between a nitrate and a nitrite is, that the former is formed by the combination of nitric acid with a base, and the latter by the combination of nitrous acid with a base, the latter containing an atom less oxygen than the former. We cannot say with certainty what would be the action of nitrite of soda on a nitrate of silver solution, as we have not tried it; but we do not think it probable you have received nitrite of soda; as it is not a common salt, there is probably some other error. You had better add the precipitate to other waste residues. 3. Glycerine and water, honey and water, treacle and water, &c., have each been recommended for keeping plates moist after development, in order to intensify and finish at home. We do not think that any of these would interfere with the intensification, if they were well washed away first; especially if the plate received a wash of solution of iodine before intensifying.

G. B.—We fear that we cannot help you in the matter you name. It would be the best plan to write to the gentleman whose name you think is wrongly used; we are quite familiar with it, and believe him to be a respectable photographer.

P. C. J.—So far as we can see, your proposed glass-room will do; but you ought to have it considerably more than 12 feet long for card pictures, as that length will not admit of the use of a lens of sufficiently long focus for defining standing figures properly. You do not state sufficiently the method in which you made and treated your bath to enable us to give you an opinion. If it now work streaky add a little acid.

T. Collins.—See report in another column.

E. J. F.—Without some practical knowledge of the subject, it is very doubtful whether you could choose, with any certainty, a second-hand lens. If you can, get a judicious and experienced friend to assist you; if not, your best plan will be to trust to the advice of a respectable dealer or manufacturer. We cannot inform you of the price.

A Country Photographer in Staffordshire.—Personal challenges as to the superiority of the productions of individual photographers are not suitable for publication in our columns. We shall have pleasure in giving our opinion as to the respective merits of anything submitted to us, but the demands upon our space forbid the publication of your letter.

A. Nepo.—The manipulation of your photograph is pretty good; but it is not well defined. Your lens seems faulty.

H. M. jun., Macclesfield.—You do not describe the nature of the stain sufficiently. It is probable they arise from the silver solution draining and coming into contact with the inner frame of the dark slide.

J. B. S.—If the shadowed side will be permanently in one place, the blue blind may be placed permanently. 2. We should prefer the spring blinds. 3. It is desirable that the blinds should slightly overlap. 4. The calico enclosed is about right. It is very difficult to give practical advice on these subjects apart from a personal examination of the conditions; but if we have not met your points let us know, and we will try to explain.

W. B. P.—There are no especial instructions for the mode of intensifying you mention. If you will explain the especial difficulty you experience, we shall have pleasure in pointing out a remedy. We constantly use it without any trouble. State exactly what steps you take, and with what result, and we shall then be able to ascertain the source of error.

A. Z.—We are glad that your cause of complaint was removed.

E. Aldis in our next.

Several Correspondents in our next.

Particulars of the Registrations next week.

All Communications for the Editor to be addressed to 32, Paternoster Row.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 293.—*April* 15, 1864.

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MR. SWAN'S NEW CARBON PROCESS.

HAS the publication of Mr. Swan's carbon process sounded the death knell of silver-printing? We think not: or if it have, the death will be a lingering and protracted one. A new process, however perfect or beautiful in result, however trustworthy as regards permanency, will not acquire in a day that universality of adoption which involves a very large sacrifice of vested interest both in experience and material. Photographers who have spent years endeavouring to acquire an intelligent mastery over the conditions of successful silver printing; who have completely fitted establishments with every convenience for exciting, toning, fixing, and washing, &c., will not readily throw all this aside to adopt at once a process which, although undeniably perfect in result, looks at first glance complicated and uncertain. They will readily persuade themselves that silver-printing, if not quite perfect, is at least good enough for nine-tenths of the purposes for which it is required, and only requires care to secure a very respectable amount of stability in its results. The readiness to anticipate difficulties and suggest defects, which characterised some part of the discussion at the meeting of the Photographic Society, the presence of the same feeling in the letters of various correspondents, even before they have seen specimens, all tend to illustrate this fact, and confirm our preconceptions as to the reception the process would meet with.

Nevertheless, we believe that for the higher branches of photography, the new process must rapidly come into exclusive use. For high class portraiture this appears to be inevitable. In cheap portraiture it is very probable that many of the sitters are merely serving a passing whim, and permanency in the pictures is not a matter of vital moment; but where good prices are paid for portraits, it is generally with the hope that they may become enduring memorials, which may be preserved by loving friends when the original form may have again mingled with dust. The certainty of permanency in such cases should supersede all other considerations. Wherever photographs are records of historic facts; wherever, from their intrinsic excellence, or the beauty of the subject, they are worthy of being preserved as works of art; wherever they are used for book illustrations, wherever they are the registers of important scientific experiments; and in a variety of other cases certain permanency will be demanded, now that it is possible, even if the facility of production were less and the cost greater than that of silver prints.

The actual difficulty or facility of the manipulations in the new process can only be accurately estimated by experiment. The inventor believes that the time required by the operations in his process will certainly not exceed that of silver printing, whilst the materials will probably not cost one half. It is estimated that a sheet of albumenized paper, excited and ready for the printing frame, costs about eightpence, and the gold and hyposulphite used in toning and fixing about twopence or threepence more. Mr. Swan, estimating very roughly, thinks that the cost of a sheet of his tissue, ready for the printing frame, will not exceed fourpence or sixpence, and there is no further cost for toning or fixing. The number of operations in the old process and in the new are about the same. In silver printing, the materials, such as albumenized paper, silver solution, toning bath, fixing bath, &c., being already prepared, there are eight distinct operations: exciting the paper, exposing it, washing the prints, toning them, fixing them, washing for many hours in many changes of water, drying, and mounting. In the new process there are just about as many operations: coating the glass with collodion, coating again with the sensitive pigmented gelatine, exposing, mounting the tissue on paper, removing the unaltered gelatine by immersion in water, rinsing in three or four changes of water during two hours, drying, and mounting. The preparation of the materials in each process may be regarded as equivalent—it is certainly not greater in the new than in the old process.

The greatest difficulty in the new process appears to lie in the timing of the exposure. Unlike silver printing, there is no definite and clearly perceptible image produced by the action of light. There is an image perceptible to the practised eye, especially if examined by transmitted light, but still this is a different image to that visible on white paper. To compensate for the difficulty in observing the exact progress of printing, Mr. Swan states that much greater latitude is permissible in exposure, a difference in exposure of at least one-fourth of the time required, making little difference either way, whilst a print exposed twice as long as it ought to be may be redeemed from waste by prolonged soaking in water, of a higher temperature than that prescribed for general purposes. Of course this last possibility of saving an over-exposed print, by altering the conditions, implies a possibility of spoiling a properly exposed picture by a similar alteration. It is worthy of remark here that, in reducing an over-exposed print by this process the reduction is regular, and does not involve the slightest loss in the half tones.

There appears to be another slight difficulty, but one which we apprehend a very little experience will serve to remove. We are referring to the mounting of the tissue on paper. This is done as we described last week, as soon as the print is removed from the printing frame, before immersing it in the warm water, to two or three changes of which it is subjected for a couple of hours. It is clear that unless the adhesive material used attach the tissue very firmly to the paper, it will become loosened in the water. In some cases it is intended that the attachment shall be only temporary, as the tissue is to be mounted again, collodion side uppermost, in order to secure the non-inversion of the pic-

ture. In some cases there may be a slight loss of the extreme crispness and sharpness of the fine lines, from being viewed through the collodion film; but in most cases this is not perceptible. It is probable, however, that in most cases where it is permissible the picture will be suffered to remain on the paper to which it is first attached, both for the purpose of securing the best result—if there be a difference in the two sides—and to save trouble; care must therefore be used to secure perfect adhesion.

We scarcely refer to the preparation of the new tissue, as a difficulty. It is a mere question of manipulation, which, in moderately skilled hands, will soon become easy. It will doubtless be prepared in large sheets, and cut up into convenient sizes for use. That is indeed the plan Mr. Swan has already adopted in his experiments. If this were convenient without any special appliances, it will become doubly easy when a little inventive skill has been applied to the apparatus and contrivances necessary for working the new method. If it should be found in further experiment that the tissue could be supplied in a state ready for use, or only requiring to be floated on a bath of bichromate, the facilities for practising the process would doubtless be increased; but there is little hope of this possibility at present.

Besides permanency, the new process possesses a few excellent qualities, which give it a great pre-eminence over silver-printing, and materially aid in securing the beauty of the print:

1st. Delicacy of definition, arising from perfection of surface. Photographers have for years been seeking for a more perfect surface than that of paper, or of albumenized paper. Various materials have been tried for improving the surface; arrowroot, india-rubber, gutta-percha, mineral enamels, &c. The earliest application of collodion to photography, was for the purpose of giving a finer surface to paper. In this process, all that has ever been sought in this direction is attained; the surface is one of gelatine and collodion combined, without texture or granulation, capable of registering the finest possible definition and gradation in the negative, a thing which skilful and fastidious photographers have long complained of the impossibility of securing on paper.

2nd. Uniformity of result. One of the troubles attending the method of toning in the silver-printing process is the difficulty of obtaining absolute uniformity of tint: a variety of excellent tones may be obtained, but different qualities of paper, different conditions of the toning bath, of the light, &c., produce variations in result very difficult to control. With the new process, the most complete uniformity of colour can be secured without trouble, and the exact variety of tint is altogether under control. In silver-printing, good results depend upon the nice balance of several chemical reactions, and on chemical conditions which are constantly changing. The paper must be of good quality, of right age, and carefully albumenized. The silver bath must be in good condition in itself, and in relation to the paper with which it is to be used; and this condition changes more or less with every piece of paper excited. The toning bath must be in a satisfactory state, and suited to the paper with which it is used; and the same of the hyposulphite fixing bath. In the new process, the sole chemical condition to be secured is the right proportion of bichromate to be mixed with the gelatine, so as to secure the requisite insolubility under the action of light—a condition very easy to secure.

3rd. Control over the result independent, to some extent, upon the character of the negative. In ordinary silver-printing, the skilled operator has a certain amount of control over the character of the picture. If the negative be hard, he can, by the use of a highly salted paper, a weak silver bath, and sun-printing, secure a moderately detailed print; if the negative be weak, he can, by using a lightly salted paper, a comparatively strong silver bath, and printing in the shade, obtain a moderately vigorous print. In the new process, however, this control exists, Mr. Swan assures us, to a much greater extent, and is secured by very simple means. By increasing the proportion of pigment or colouring matter in the gelatine, it will readily be seen that a very thin layer of it will give a very deep tone to the blacks, so that the greatest intensity may be secured in the shadows by a short printing before the lights are degraded in the slightest degree. So that by using gelatine with a full proportion of colouring matter, the greatest possible contrast may be secured with weak negatives; and conversely, of course, with hard negatives; by using gelatine very slightly coloured, a thick layer will be necessary before deep blacks are obtained, and as the printing must be prolonged to secure this thick layer, the half-tones in the negative, which are hurried by over-intensifying, have time to overtake the shadows, and thus produce harmonious prints. To understand this principle properly, it is only necessary to bear in mind that in using water colours whilst one thin wash of any colour produces a light tint, several washes of the same depth of colour, one over another, will produce a very dark tint. The control which the operator secures over the result, by taking advantage of this principle, will often be most valuable in obtaining good pictures from indifferent negatives.

Whilst we think that the process on the face of it, dispassionately considered, presents a large preponderance of advantages over silver printing, we are aware that practice alone will determine its real merits, and we are also aware that it presents a sufficient number of initial difficulties to deter many busy photographers from entering into the matter until it has had a more extensive trial in other hands. We think, therefore, that Mr. Swan has done wisely, as well as liberally, in intimating his intention to permit amateurs to use his process unrestricted by his patent. He thus prevents his patent from becoming a barrier to progress and improvement. Enthusiastic amateurs have very often, in the history of photography, by assiduous experiment, shown the way to professional men, and developed the capabilities of the art in directions before untrod. It is probable that in matters of detail and practice amateurs will well repay, by valuable suggestion, the privilege conferred upon them by exempting them from the patent restrictions in this instance.

On the legality of Mr. Swan's patent, and also on the application of the process to the production of photographic enamels, we shall have something to say in our next.

SALTS OF PLATINUM, RHODIUM, IRIDIUM, &c., IN TONING.

It is somewhat remarkable that so little attention has been given by photographers to the possible value for toning purposes of other not readily oxydized metals besides gold. It is probable that further experiment with the chloride of platinum would well repay the photographer. The only recorded experiments which we remember were undertaken at a period when the use of alkaline toning solutions was scarcely understood; and although the results then obtained were stated to be promising, there were difficulties in the way, which seemed to check further progress. More recently, we have seen some very excellent results, produced by Dr. Maugham, whose experiments we record on another page. The tones he obtained were of a pure, rich, neutral black, very valuable for many purposes. From what we have seen, it appears that platinum differs from gold in yielding shades of brown or a pure black, rather than the tendency to purple given by a solution of gold. Tastes will differ as to the value of the tint; but the material possesses this advantage, that it is much cheaper than gold.

We have before us a very interesting series of prints, illustrating a series of experiments, undertaken to test the value of several other easily reducible metals, besides gold. The metals used were platinum, rhodium, and iridium alone, and combined with each other, and with gold. The experiments were undertaken by Captain Sellon, whose residence in India prevents the ready reference we should have de-

sired, to enable us to state many particulars at present unexplained. The form of salt used in each instance was a sodio-chloride of the metal, so prepared for convenient exportation. The only information we have as to the formula used in preparing the bath, is that the ordinary alkaline solution, found to answer with chloride of gold, was employed.

With rhodium alone, a slight, but very slight amount of toning is produced. The prints have not proceeded beyond a brown, but it varies slightly from the foxey brown of hypo-sulphite fixing without toning. One print immersed in the toning bath for forty-five minutes, is of a warm brown tone, with a somewhat rosy bloom. Another print immersed in the same bath for sixteen hours, is of a deeper brown, rather resembling the tint of burnt umber, but by no means pleasing. There are several samples of the various mixtures of the same salt, with chloride of gold, and these improve in quality pretty nearly in the direct ratio to the increase in the proportion of chloride of gold.

The only example before us in which chloride of iridium was used, is not toned with that salt alone, but in combination with the chloride of gold; and as it presents no distinctive features, which might not have been due to the gold only, we are unable to form an opinion as to its operation.

With platinum alone, or with platinum in combination with gold, or gold and rhodium, a variety of pleasing tones are obtained, inclining to purple or black, in proportion to the amount of gold used. Our general conclusion upon the evidence here before us, is in favour of gold only, as giving the greatest variety of pleasing tones with the least trouble. The prints of Dr. Maugham, however, unquestionably suggestive of platinum, and we commend his remarks to the attention of our experimental readers.

Scientific Gossip.

A Series of valuable contribntions to photographic physics have been lately communicated by Dr. W. A. Miller. Some of these are already known to photographers, having been published in brief abstract in one of the journals, but most of the facts which bear upon the science of photography are unknown, except to very few, and we, therefore, think that we shall be doing good service to our readers if we place before them the principal facts which he has discovered For many years past, Dr. Miller has been occupied in investigating the absorptive action which the different media exercise on the chemical rays of light. He has examined the effect of their transmission through solids, through liquids, and through gases and vapours; he has also investigated the absorption of the chemical rays by reflection from polished surfaces, and the photographic effects of the electric spectra of different pure metals and alloys taken in air, and also when the sparks were transmitted through gases other than atmospheric air. The general arrangement of the apparatus employed in all these researches resembles that of the ordinary spectroscope. The prism is of rock crystal, a substance which has been shown to be almost perfectly transparent to the chemical rays of light. The collimating lens is removed, and the remaining lens (the object glass of the telescope) is also composed of quartz. The eye-piece is removed, and in its place is a small photographic camera, by means of which the image of the spectrum of any light which passes through the slit at the other end, may be received on the ground glass, accurately focussed, and then photographed. The source of light in these experiments is required to possess certain peculiarities. It must be perfectly constant (as far as length of spectrum is concerned), it must contain the very highest chemical rays, and it should be readily obtainable at any desired moment. The most convenient source of light fulfilling all these requisites was found to be that obtained when sparks from an induction coil were taken between two pieces of fine silver. The spectrum of this light was remarkable for its great length, extending beyond the termination of the visible rays for a space equal to five or six times the length of the luminous portion. The collodion was prepared according to Hardwich's formula, iodized with a mixture of equal parts of iodides of potassium and cadmium, and was perfectly uniform in its action, even for weeks after it had been iodized, if kept in the dark; in some cases a bromide was used in the collodion. The exposure of the sensitive plate in these experiments was about 5 minutes, and the development was conducted in the usual way. For the measurements of the spectrum a scale of millimetres was used, the length 74 being that of the direct silver spectrum when transmitted through air, or through ice, quartz, fluorspar, ammonia, or water. No solid or liquid substance surpasses these in transparency, but pure rock salt, or white topaz, approach them very closely. A remarkable result was obtained with the diamond, several thin slices of which were found to be very much inferior to rock crystal; one slice of ·18 of an inch thick, leaving the spectrum only 19 millimetres long. Amongst the various compounds examined, the fluorides rank first, then follow the chlorides, then the bromides and iodides, the latter being very slightly diactinic. Sulphates are generally transparent, but sulphite of soda cuts off more than half of the spectrum, and hyposulphite of soda more than five-sixths. The most remarkable group for absorptive power is formed by the nitrates. Nitric acid, whether dissolved in water or in combination with a metallic oxide, has a specific action in arresting the chemical rays. The more refrangible portion it transmits freely, and then intercepts the spectrum at the same point, whatever base be united with the acid, provided the base be capable of forming diactinic salts. Of the bases, those of the alkalies and alkaline earths are eminently transparent. Lead, zinc, and mercury are nearly as good, but coloured bases, like those of iron, nickel, cobalt, or copper, are very inferior, and in some cases, as with nitrate of nickel, they are perfectly opaque. The latter salt, indeed, is so opaque that it might be made of great use as a screen for the dark laboratory. A saturated solution three-quarters of an inch thick absorbs the whole of the chemical rays, whilst it allows nearly all the luminous ones to pass through. A narrow glass bath containing this liquid would, therefore, be the most effectual means of illuminating the dark room. Nitrate of silver gives results which appear at first sight more important than they really are. A saturated solution three-quarters of an inch thick absorbs no less than seven-eighths of the actinic rays of light, cutting down the spectrum from 74 millimetres to a little over 9. When we consider that a collodion plate is taken dripping from the silver bath and exposed in the camera coated with a film of this highly opaque liquid, we are quite prepared to believe that a great number of the valuable rays are struck down just at the moment when they are most wanted, and that the sensitiveness would be considerably increased by washing the opaque nitrate of silver off with the diactinic liquid water. This, however, does not necessarily follow. Believers as we are in the conservation of force, we hold that the opacity of nitrate of silver is a necessary consequence of its sensitiveness to light. In experiments of our own, tried ten or twelve years ago, we found that transparent films of photographically sensitive bodies were perfectly opaque to the chemical rays of the solar spectrum. A film of chloride of silver, for instance (prepared with a chloride of strontium collodion and nitrate of silver bath), when first interposed between the spectrum and the photographic plate, was perfectly opaque to the chemical rays, although it was optically colourless and transparent. After being exposed to the sun's rays for some time, its actinic opacity disappeared, and a photograph of the spectrum could then readily be obtained when it was interposed. Similar results were obtained with bromide and iodide of silver screens. The explanation of these phenomena is simple. If the chemical rays of light pass freely through a substance, they cannot possibly exert any action upon it: they obey the same

laws which govern Armstrong bolts and armour plates. If the bolt, whether from the sun or the gun, passes by with its velocity unimpeded, it is evident that it does no *work* on the plate, but if its progress is arrested, the force of impact, which it spends on the surface placed to receive it, is accurately translated into *work done* on the plate. The correlation of the forces remains the same whether the force is expended in disturbing the equilibrium of iodide of silver or in interfering with the molecular arrangement of a six-inch armour plate. We thoroughly believe that whenever the chemical rays of light are absorbed, work is done by them. In some few instances, as in photographic films, we see the result obtained by the quenching of the chemical rays, and in other instances, as when the chemical rays are absorbed by yellow fabrics, we get their equivalent of *work* in the bleaching action which gradually takes place. But in the case of yellow glass, we have not yet found out what becomes of the absorbed chemical rays, although we are confident that the progress of experimental science will, before long, reveal to us into what force these defunct actinic rays have been transmuted.

TONING WITH SALTS OF PLATINUM.

BY DR. MAUGHAM.

About two years ago, whilst making some experiments with a lady on the subject of toning photographs, it struck me that chloride of platinum might be used in the place of the gold solution usually employed. The effects produced by the precipitated platinum on the first picture operated upon were even better than I had anticipated, and I was, in consequence, induced to make further trials. I had at hand a saturated alcoholic solution of chloride of platinum, and at once added about ten drops of this to eight ounces of water, and then immersed a print, till I imagined it had become satisfactorily toned by this method.

The specimen which I send you is the only one, and the worst, I have left out of several specimens that were toned by the chloride of platinum, the others having been distributed amongst friends. The prints were all submitted to the action of hyposulphite of soda, in the same manner as when terchloride of gold is employed, and were then well washed in water. You will perceive that the albumen has a peculiar yellow tinge, the cause of which was not at first apparent; but I soon discovered that it was owing to the accidental presence of iron in the platinum solution. By washing the prints afterwards in a weak solution of oxalic acid, the iron stain was completely removed. I afterwards used, in a hasty manner, a mixture of terchloride of gold and sodium, with the alcoholic solution of platinum, which imparted a very peculiar pink tint to the photographs operated upon, but did not pursue this treatment, as I found the mixed solutions, after standing some time, exhibited a dark coloured, metallic precipitate, and I since find that the pink tone, at first produced, has changed to a dark brown. At this distance of time I cannot remember all the details of certain other experiments which were made; but have not the least doubt that, by employing other chlorides, whose metallic bases are not affected by atmospheric agency, desirable effects might be produced in respect to toning. I merely throw out these hints to those who are engaged in photographic pursuits, having no time to go further into the subject myself.

As bichloride of platinum forms double salts with alkaline chlorides, it might be tried like chloride of gold in a double form. It may be here observed that if operators would make their own chlorides of gold, platinum, &c., they would not be subject to the inconvenience of obtaining these articles in an adulterated form, and would be saved the trouble of testing their purity. The best way of evaporating either of the above-named chlorides is by means of a water bath, and after the chloride is approaching the state of dryness let distilled water be added, and evaporate again. This should be repeated until all adhering acid is entirely removed. The quantities of the acids employed vary with different operators, but 1 part of NO_5 to 3 parts of H Cl are, perhaps, the best, if the acids be sufficiently strong. They should not be boiled, as that would expel a great portion of the nascent chlorine which ought to be retained to act upon the regal metals.

DRY COLLODION.

BY M. VERNIER, JUN.

In my recent communication upon dry collodion, I promised to communicate a simplified process, which consists of the following:—

In two bottles, each containing 2 ounces of alcohol, dissolve separately 90 grains of tannin and 90 grains of bromide of cadmium; shake the bottles, and when the solution is complete, put 75 minims of the solution of tannin, and 10 drops of the solution of the bromide, into 4 ounces of any kind of plain collodion, provided it be of the proper density, and that the presence of free iodide is denoted by a deep yellow tint, and that it yields excellent negatives by the wet method. Shake the bottle, and leave it to settle for four-and-twenty hours.

Next day, coat a plate with the above-mentioned collodion, immerse in the sensitizing bath, and do not remove it from the bath until all greasiness of surface has disappeared. After it has drained, immerse it in a dish containing 3½ pints of water, to which 6 drachms of sulphuric acid has been added; wash the plate in this bath for two or three minutes, without fear of detaching the collodion, which will resist the washing. Remove the plate from the bath, and put it to dry spontaneously, placing it in a dark box, the bottom of which is covered with bibulous paper. Two or three days afterwards, when the drying is complete, expose it to the light. It will be remarked, in placing the plate in the negative frame, that the brown tint which characterizes plates prepared with tannin has entirely disappeared. This is due to the action of the washing bath.

After exposure, which requires some seconds more than in the wet process, it will be remarked that the parts most strongly impressed by light are already depicted on the film of iodide of silver. Put the plate to soak some moments in the special bath, in which it was washed before exposure, and develop the picture by the ordinary means, either with gallic or pyrogallic acids, or with sulphate of iron. These several reducing agents must be acidulated and receive an addition of alcohol. This is the whole process, it is simple and easy, and eccentric in its way, it will surprise many operators, and remove many of the objections of the partisans of copious washings, and multiplied operations.

Appendix. We cannot state precisely how long the plates prepared in the manner described above will retain their sensitiveness; to keep them indefinitely, it will perhaps be as well to submit the plates to a second washing on removing them from the special bath, in order to remove the excess of sulphuric acid. However, prepared according to our simplified formula, they may be kept fifteen days without deterioration. This lapse of time is more than sufficient to satisfy the requirements of landscape photographers.

In pursuing our researches, we have sometimes perceived that the plates immersed in a stronger bath of sulphuric acid, dried with difficulty. This is a very important fact for operating with rapidity, for the plates prepared one or two evenings previously, retain a certain degree of humidity which renders them as sensitive as wet collodion.

Our researches upon the special bath of sulphuric acid, have also proved to us that in following the usual processes of the wet method, that is to say, without employing tannin, we obtain as excellent results as by the dry way, after submitting the plates to the modifying action of the sulphuric acid bath before exposure. Still, this mode of proceeding is a little less rapid than in combining together the two reagents. This peculiarity is due probably only to a

determined strength of the special bath. We regret that we have not pursued our researches respecting this strength, other labours compel us to abandon our researches upon dry collodion for some time. However, experience shows us that we must augment the dose of sulphuric acid to arrive at this sensibility. Lastly, to render a good account of the action produced by the sulphuric acid upon our argentic compounds, we have followed to the letter the ingenious indications of M. Poitevin, relative to his beautiful discovery, and we have recognized, in obtaining a picture after a very long exposure, that sulphuric acid diluted with three parts of water, may be assimilated with free nitrate of silver, to the effect of rendering sensitive a film of chemically pure iodide of silver, thus we offer to amateurs of dry collodion in sulphuric acid, a new modifier of iodide of silver, varying under different relations with tannin, but which combined together in our photographic processes, have led us to reduce the difficult problem of dry collodion to its simplest expression.—*Le Moniteur de la Photographie.*

A NEW CARBON PROCESS.

BY JOSEPH W. SWAN.*

Beautiful as the ordinary silver-printed photograph unquestionably is, as it comes fresh from the hand of the skilful printer, yet a troublesome doubt as to the duration of its beauty always more or less mingles with and mars one's admiration. There is, unfortunately, no denying the fact, that ordinary silver prints are *very liable to fade*, and that immense numbers of them *do fade*. This constitutes the one great blot on the fair fame of our beautiful art, and has stimulated with the urgency of a necessity the search for *some process that would give photographic prints of reliable durability*.

In quest of such a process, experimentalists have naturally thought of carbon as *the* substance of all others, which (if photographic pictures could be produced with it as the colouring matter) would afford the strongest guarantee of permanence. Many attempts, attended with more or less success, have from time to time been made to attain this desirable object, but hitherto, I believe, none of the processes proposed have been so far practicable as to come into general use. Either the results have not been considered sufficiently perfect, or the means of obtaining those results have been too difficult or troublesome for commercial purposes.

I think I have succeeded both in obtaining good results, and in obtaining them by means which are simple and adapted to operations on an extensive scale. The principal means by which I have arrived at this result is by the employment of a tissue, pliant and manageable as paper, and transparent and smooth as glass.

This tissue, in fact, takes the place of the paper or glass, one or other of which have hitherto been made use of as a means of supporting the photographic materials employed in carbon printing. The tissue is formed of collodion on one side, and a gelatinous compound on the other. The gelatinous part of the tissue consists chiefly of gelatine, and contains a salt of chromium, carbon, and saccharine matter. The chemical principle that I have availed myself of in the carrying out of my idea was discovered twenty-five years ago by Ponton, and it is this, that gelatine, in combination with a salt of chromium, becomes insoluble in water after a short exposure to sun-light.

This principle is capable of application to photography in many ways, one of the most obvious of which is to mix a pigment with the bichromated gelatine, and coat paper with it: expose this paper to light, under a negative, and then wash away those portions of the coating not affected by the light. The exposed parts, having become insoluble, remain attached to the paper, and so produce a picture. But this mode of operation is inapplicable to the case of negatives containing half-tone, and for this reason:—The action of the light is to render the gelatinous coating insoluble, and, consequently, to fix the colour that may have been mixed with it. This action commences at the exposed surface, and extends through more or less of the thickness of the coating. Where the light has acted most strongly, perhaps the *entire thickness* of the coating is converted to the insoluble condition; but where the light has been obstructed by the half-tone of the negative, the converting action has perhaps only reached through *half* the thickness of the coloured coating: and observe—the converted half is the *upper* half, and half-tone would have to be got by the removal of the unconverted under half; but the insolubility of the upper stratum renders this impossible, the soluble under stratum being shut in and sealed by the insoluble upper stratum. So either the upper stratum must be *broken through*, to let out the still soluble under stratum, or the under stratum must remain where it is.

In one case there is the deep shade of the entire coating, and in the other the bare paper; either way there is no hal-ftone. To overcome this difficulty, it was proposed by Mr. Blair* to print from the *back* of the prepared paper, so that the light would pass through the paper, and strike *first* upon the *under stratum* of the coloured coating. The converting action of the light would then graduate from the *under* to the *upper*, instead of from the *upper* to the *under* stratum.

In this case, where only half the thickness of the coating was converted, the unconverted half would be *uppermost*, and there would therefore be nothing to prevent its removal. Improved half-tone was obtained in this way; but the light having to pass through the substance of the paper before reaching the sensitive coatiug, there was a serious loss of definition in the picture, and of time also in the printing.

Previous to the publication of Mr. Blair's proposal, I had recognized the principle of it, and had made some unsuccessful experiments with plates of glass coated with Mr. Pouncy's carbon mixture, exposing them in the camera with the uncoated surface of the glass toward the light; the light, therefore, acting from the under to the upper stratum of the carbon coating, as in Mr. Blair's plan.

But, as I have said, those old experiments were unsuccessful.

The way iu which I *have* succeeded is by means of the tissue already referred to, both glass and paper being discarded altogether until after the printing.

I have already stated that the tissue is composed of collodion on one side and bichromated gelatine, mixed with sugar and carbon, on the other.

The mixture of gelatine that I used in making the specimens I have here, consisted of 1 part of a solution of bichromate of ammouia (containing one part of the salt in 3 parts of water), 2 parts gelatine, 1 part sugar, and 8 parts of water, with colouring matter added to produce the depth of tint required. The pigment used iu most of those specimens is indian ink, either alone or mixed with indigo and carmine.

The tissue is *formed* by coating a plate of glass or other smooth surface, first with collodion, aud theu with the coloured gelatine mixture above described, the two films unite, and when dry, may be separated iu a sheet from the surface they were formed on.

By this means a pliant tissue is obtained.

(Here is a specimen). It may be haudled like paper, and may either be used in large sheets, or cut up into pieces of any convenient size.

We have now advanced as far as the printing stage. The tissue, prepared in the manner described, corresponds with sensitive paper, aud I think, with proper appliances, the preparation of it need not be more troublesome than the double operation of albumenizing and exciting paper in the usual way.

The tissue is much more sensitive to light than ordinary sensitive paper, and proportionately more care must be

Read at a meeting of the Photographic Society, April 5th.

* We explained in our last that Mr. Burnett was the first to indicate this method.

exercised to guard it from the action of light, other than that which acts upon it while in the printing frame. Like sensitive paper, too, it is better used soon after its preparation.

The printing is done in the usual way, the tissue taking the place of sensitive paper, the collodionized surface being placed next the negative. The sensitiveness of the tissue may of course be varied by varying the proportion of the components of the gelatinous part of the tissue; but with the mixture I have given, which was used in making the specimens I have here, the time of exposure required is only one-third or one-fourth of that which would be usually given with highly sensitive albumenized paper.

The proper time of exposure can be determined pretty accurately, after a few trials, for although there is not the same means of judging of the progress of the printing, as in the ordinary process, yet there is a far *wider range* between *under* and *over exposure* than in silver printing. It is no exaggeration to say, that you may expose one piece of tissue twice as much as another, and yet obtain a good print from both; not perhaps *quite* so good as between the two extremes, but yet much more passable than would be the case with silver prints, under and over exposed to the same extent.

There is one means however, by which *any mistake* in *timing the exposure may be altogether avoided*, and this is, by the use of a photometer. I am busy with experiments, with a view to the construction of a practically useful form of this much needed instrument, and I hope soon to be able to place the result of those experiments, before you. I cannot help remarking, that it appears to me a kind of *disgrace* to us, that we have so long stumbled on, in the haphazard clumsy way we have done in the matter of exposure; sometimes under exposing, and sometimes over exposing, and only now and then hitting the right degree exactly.

The use of a photometer, even in ordinary silver printing, would, I feel sure, avoid much waste of material, save time also, and lead to more uniformly good results. Instead of turning back the print from time to time to see how the printing goes on, at the risk of shifting the paper, letting in dust, and hurting the negative, we should only have to glance at one photographic clock, and that glance would inform us much better how the printing progressed, than the more tedious mode of examination now commonly practised. With a proper classification of negatives, say into three classes, the weak negatives forming one class, the dense another, and the medium another, all of one class being exposed simultaneously, and with a photometer to determine exactly the amount of exposure which produces the best result, the operation of photographic printing on an extensive scale might be made as certain and uniform as common printing is.

I repeat, a systematic arrangement of this sort, combined with the use of a photometer, would prove very advantageous even in silver printing; and if carried out in carbon printing, it would completely meet the difficulty which may be supposed to attach more particularly to it, but which, practically, is not greater than in the process now commonly practised, because, as I have already said, a mistake in the exposure does not produce the same extent of failure in the carbon process as in the ordinary one.

On taking the tissue from the printing frame, the image is faintly visible, and the next step in the process is to mount the tissue, with the collodionized face down, upon a piece of paper, or any other suitable material, to act as a support during development, and sometimes to form the basis of the picture, which may, if we please, remain permanently attached to this support, or may, if thought better, be afterwards transferred in a manner which I will presently explain.

There are several ways of mounting the tissue, and several adhesive substances may be used for the purpose. I have used starch with success; but the specimens which I shall have the pleasure of exhibiting to you were mounted upon paper by means of a solution of indian-rubber and dammar in benzole.

After mounting, the tissue, with paper attached, is placed in water of about 100° Fah. The water presently begins to dissolve away the non-solarised portions of the gelatine, and in a few minutes the picture is fully disclosed.

It is, however, advisable not to hurry the operation, but to give the water ample time to dissolve out the bichromate. It is also advisable to change the water three or four times. I prefer to leave the prints about two hours in the water. Where the picture has been over-exposed, longer immersion and hotter water will, in a great degree, rectify the mistake. Before finally removing the prints from the water, I brush their surface lightly with a broad camel-hair brush; and after taking them out, I pour a stream of water over them, to remove any loosely adherent particles of foreign matter that may, by accident, have got attached to the surface.

The prints may then be hung up to dry, and are finished, by being mounted on cardboard and rolled, in the usual manner.

Another way of proceeding is to *remount* the developed print *face downward*, upon a second piece of paper, or card, say with starch, or gelatine, and when this is dry, to remove the paper that was attached to the tissue previous to development, this can easily be done if the surface of the paper is moistened with benzole.

In one way the image is *reversed*, and the collodion surface is *downward*, and in the other the image is *not reversed*, and the collodion film is *uppermost*.

In practice, I think the transfer process will not be found difficult, yet, probably, the simpler mode will generally be preferred, and the objection of the reversal of the image be met, either by taking the negative *through the glass*, or by transferring the negative by means of gelatine. I greatly wonder that negatives are not more frequently transferred, there is really no great risk of a miscarriage, and when it is done, the negative is much safer than when on glass; there is not the liability to breakage, nor the same chance of injury to the surface by use.

With respect to the material introduced into the gelatine, to give colour, this may, of course, be varied, according to taste, and the character of the subject. In some of the first pictures that I sent to Mr. Simpson, one of the aniline dyes was introduced; possibly these, and other dyes also, may be found useful in the coloration of the tissue.

Carbon produced by the action of sulphuric acid upon sugar, has been proposed as a likely form of carbon for photographic printing. I believe this form of carbon will not be found suitable; it is of a flocculent character, and the particles, however finely ground, tend to agglomerate; the same objection applies to lampblack, although I have obtained some degree of success with it.

Although my operations in carrying out the process I have described have hitherto been conducted on a small scale, yet I feel assured that it is capable of being carried out on a large scale, and not only carried out, but with much better results than I have obtained.

It now only remains for me to thank you for the attention with which you have listened to me, and express a hope that you may look as favourably upon my process as you have upon my pictures.

Perhaps, Mr. Chairman, it may be well, before any discussion on the scientific phases of my process commences, to anticipate a question, which I have no doubt is in the minds of many of the members: and that is relative to the patent which, probably, most of you are aware, I have obtained for the process.

My first feeling was to communicate the process to your society, and allow it to be practised without any restriction, and I communicated this idea to Mr. Wharton Simpson, who, with the alacrity of friendship, quickly made an arrangement, and had it announced accordingly.

A further consideration of the subject, and a recollection

of the fact, that photography has its commercial as well as its scientific aspects, determined a different course, and I have protected the practice of the process by patent; and in reply to the question how this is to be dealt with, as a matter of business, allow me to say, that as yet I have come to no positive decision on this point.

I was most anxious that the Society, and through it photographers generally, should, as early as possible, be informed of the details of a process possessing so much interest, and have, therefore, communicated my process before the commercial bearings of the subject have been duly considered.

I may, however, say this, that if the patent right remains in my hands, I shall probably charge a small premium to professional photographers and impose a small tax, perhaps of a farthing, for each picture sold, as I wish to participate to a small extent in the profits that may arise from *extensive* application of the process, rather than by laying on it so heavy a tax as to limit its use; and it would be quite averse to my feelings to impose any unwonted restriction upon the experimental development of the photographic art. I shall probably not put any restraint whatever upon the operations of amateurs; but allow my process to be practised freely so long as it is not a matter of trade.

I do not make this statement as of a matter definitely settled; but beg you to accept it with the qualification that they are merely hastily formed ideas, which mature deliberation may require me to modify.

RETOUCHING PAPER POSITIVES.

BY M. DE LA BLANCHERE.

§ 1. For retouching paper positives, there will be required,

1st. A china palette with divisions.

2nd. Half-a-dozen camel-hair pencils of various sizes.

3rd. Paints; the principal of which are cakes of permanent white, ivory black, neutral tint, carmine, light red, burnt sienna. With these six pigments, we can produce all the hues given by the various methods of toning known.

4th. A glass of water with a small piece of sponge to clean the palette with, and moisten the proof, if necessary.

5th. An eraser, drawing pens, maguifying glass, indiarubber, a square, &c.

§ 2. Care must be taken in the preliminary fastening of the proof, that it be perfectly adherent to the cardboard, so that, in the case of large flat tints being required, the paper does not swell up in unsized places which, by rejecting the liquid from the elevated spots, will produce a light space upon a deeper ground. However, as prudence suggests that we should proceed cautiously; that is to say, by exceedingly light tints, it may happen that, after having spread several tints, the swelled portion having lost its sizing, will not retain the colour completely. A very careful mounting is therefore an essential condition of a clear and easy retouching.

§ 3. To perform this operation, all gum or dextrine must be banished from the sizing of the proofs, because it too frequently happens that the photographic paper which has remained in the toning baths, has, *in places*, lost the sizing with which it was imbued. Moreover, it may also have been changed in the washing baths; and in such places, the gum or dextrine with which the proof was mounted, will pass through. This inconvenience does not exhibit itself at the time it is sized; but when a tint, however light it may be, is passed over it, it becomes doubly intense upon those parts where the gum or the dextrine have passed through, and made a spot.

§ 4. We must avoid toning the proofs on salted paper, in baths containing chloride of lime, because this substance attacks the texture and the sizing of the paper, so that, when the immersion of the proofs in these baths is, by the necessities of the toning, very prolonged, the paper, upon being taken out of the bath, is almost as porous as blotting paper. We can, it is true, size the proof before working upon it, but this method also presents very serious inconveniences, because the paper will then not hold the colour properly, and the painter is obliged to pass his brush over the same place several times, which is almost certain to give a mottled appearance, because the second tint will remove the first in those places where the molecules of the sizing are closest together.

§ 5. The best sizing to employ, when any is required, consists of a solution of gelatine, 5 parts in 100 parts of water. The proof is left in the warm solution during 10 or 15 minutes, before it is mounted on the cardboard.

As it is essential for the paper to be very regularly imbued. the proof is hung up to dry before being mounted. It is, however, always much better to be obliged to have recourse to these means to restore to the paper the body it has lost during the operations of toning and fixing.

§ 6. In retouching, as in drawing, the artist must be seated conveniently, either at a table with sloping top, or the proof must be fixed to a drawing board, the bottom of which rests upon the knees, the upper portion resting upon the edge of the table, the arms must be perfectly free, with nothing to embarrass the artist's movements.

If it be intended to mount the proof upon a cardboard leaving a large margin, as this would be inconveniently in the way during the retouching, the proof should be previously stretched on a drawingboard, or on a stout millboard, fastening it by its margin with smooth glue, care being taken to glue it only by its extreme edges, so that when finished the proof may be cut away from its margin without damage, when it is ready to be mounted. The finishing touches will be given only after the proof is mounted.

§ 7. We commence these instructions with *proofs upon salted paper*. The black retouching consists not only in the more or less perfect covering of the spots resulting from the manipulations of the operator or the printer, it must *perfect* the positive proof, and it is useful for the artist to operate as much as possible upon the negative, and render it perfect; there will then be much less required to be done in the positives. We have said that retouching must be the giving effect to the positive proof. By artistic effect, we understand the remedying the photographic imperfections with regard to lighting. For, it must be remembered that the painter most frequently seeks his effect by illuminating his model with a single light, either from the side or opposite, while in photography, in order to abridge the time of exposure as much as possible, the object is strongly illumined on all sides, front as well as side, which very frequently produces badly modelled pictures. These ill-modelled images arise also from a prolonged sitting; such defects the retouching must rectify, sacrificing, if need be, one part to give importance to another, and giving to each part its true artistic value. We cannot too strongly urge upon the artist, to study the proof carefully before applying his pencil to it, then to give some strokes of the pencil on such parts only as require strengthening to lay a foundation, as it were, for the artistic work further required.

§ 8. When the artist has mixed the required tint, and tried it upon a piece of white paper, and satisfied himself that it matches the colour of the proof as nearly as possible, he will fill a pencil with the tint, and after applying it to a piece of blotting paper to remove the superfluous quantity, he will commence with the face, if the subject be a portrait, strengthening,

1st, The line of the eyelids, softening the depth of colour in proceeding towards the lighter part. 2nd, The line separating the lips, taking care not to go beyond the extremity indicated in the photograph, and slightly enlarging the line upon reaching the extremity. 3rd, Marking the interior of the nostrils. 4th, Strengthening the black of the eye, reserving the spot of light as it exists in the proof. 5th, Continue, by means of light tints, to soften the features, which are generally rendered too hard, blending the lights with the shadows on the side where the light has not fallen.

Before finishing the face, the hair must be produced in the same manner; that is, to follow with a light tint exactly the

lines and contours given by the proof. In this retouching, special care must be taken to avoid too much detail. The hairs are not made to be counted; for in that case, instead of hairs, we should have roots: we must see only masses. It will be the same with the beard.

Whenever a tint is passed over the beard or hair, in those parts next the face a brush moistened with clean water must be employed to blend the tint and soften it down, to avoid the effect of a wig.

§ 9. The eyes also demand great care from the artist, for upon them depends, in great measure, the expression of the portrait. They must be enlarged as much as possible. To complete the face, take a fine pencil, charged with a light tint, and touch the inequalities of the surface of the skin and the paper. To this end, as it happens that we do not see them always in the direction they have in the proof, after having touched them in the direction we have marked, turn the proof upside down. We shall then perceive other little points which are to be covered with the same pencil, but with a *lighter* tint; otherwise it will happen, that when the picture is placed in the position in which it is to be viewed, as many little black spots will be visible as times the pencil has been applied to the proof. It will be a useful precaution to take before dismissing the picture, to pass it through a rolling press, and then, hanging it up, to examine it at a moderate distance, for the general effect.

(*To be continued.*)

ON THE PRINCIPLE OF IMITATION AS APPLIED TO THE DECORATIVE ARTS.

BY THOMAS PURDIE, ESQ.*

The reaction which, within the last thirty years, has set in and run with so strong a current in favour of mediæval architecture has been accompanied by a taste for a similar style in furniture and decoration, in painting and in the forms of worship. The question of rituals is altogether foreign to our province. Nor is it my purpose, in the remarks which I have to bring before the Society of Arts, to discuss the relative merits of Classic and Gothic architecture, of post or pre-Raphaelitism in painting. It seems to me that no man can be a faithful apostle, or even a true loving disciple of art, until he has become truly catholic in his taste and tolerant in his practice; until he has seen the vision of the sheet descending from above, and is prepared to find beauty as well as pleasure in every style of art which has exercised the taste, the skill, and the ingenuity of man. But as the waves raised by this eruption of mediævalism into our times have flowed in ever-widening circles, over the feelings of the age, they have left their impress on objects which, *à priori*, no one could have expected they would reach. In the discussions which of late years have been carried on, on the subject of art, language has been perverted from its original meaning, ethics and æsthetics have been jumbled together, bad taste has become confounded with moral turpitude, stucco, when employed to decorate the exterior of a building, is denounced as an unprincipled sham: an ornamental casting as a falsehood, because it may resemble a carving; a composition or painted imitation of a wood or a marble, as a downright and inexcusable lie.

It is my object, by a candid examination of the subject, to try to educe some principle,—to ascertain in what cases ornamental castings and composition or painted imitations of material may be employed, without infringing the laws of propriety or good taste; or whether the use of such appliances belongs to the same category and is to be subjected to the condemnation generally awarded to such practices as the wearing of false jewellery, or the restoring by means of rouge the tints of the rose to the cheek of the faded beauty.

As the text of the present discussion, and as representing that view of the question from which, after a full and, I trust, a fair consideration, I venture to differ, I shall quote one or two passages from a celebrated author, who is generally considered one of the soundest art-critics of the day. Between the principles of mediævalism and the practice of those imitative arts which shall come under our notice there is no absolute or necessary antagonism. I trust, therefore, it may not be supposed that in supporting the one I must be held as condemning the other. In urging the toleration of certain decorative appliances, I yield to no one in admiration of the glorious structures of the middle ages, in which our forefathers have left,—in a fossil form, for the study of the geologists of history,—a record of the taste, the spirit of self sacrifice, and the religious sentiments of the age in which they lived. Indeed, it will be found that I shall arrive, in numerous instances, at the same practical conclusions with my opponents, although we may have taken different roads to get there.

Touching the false representation of material, says the talented author referred to, in one of the eloquent denunciations for which he is famous, "The question is infinitely more simple and the law more sweeping; all such imitations are utterly base and inadmissible. It is melancholy to think of the time and expense lost in marbling the shop-fronts of London alone, and of the waste of our resources in absolute vanities, in things about which no mortal cares, by which no eye is ever arrested, unless painfully, and which do not add one whit to comfort, or cleanliness, or even to that great object of commercial art—conspicuousness. But in architecture of a higher rank, how much more is it to be condemned. I may perhaps be permitted," he continues, "while I express my sincere admiration of the very noble entrance and general architecture of the British Museum, to express also my regret that the noble granite foundation of the staircase should be mocked at its landing by an imitation, the more blameable because tolerably successful. The only effect of it is to cast a suspicion upon the true stones below, and upon every bit of granite afterwards encountered."

And again, at another part of the same book:—

"The worth of a diamond is simply the understanding of the time it must take to look for it before it is found. Exactly as a woman of feeling would not wear false jewels, so would a builder of honour disdain false ornaments. The using of them is just as downright and inexcusable a lie. You use that which pretends to a worth which it has not; which pretends to have cost, and to be, what it did not, and is not—it is an imposition, a vulgarity, an impertinence, and a sin. Down with it to the ground, grind it to powder, leave its ragged place upon the wall rather; you have got paid for it, you have no business with it, you do not want it. Nobody wants ornaments in this world, but everybody wants integrity. All the fair devices that ever were fancied are not worth a lie. Leave your walls as bare as a planed board, or build them of baked mud and chopped straw, if need be, but do not rough cast them with falsehood."

I cannot agree with those who think there is no force in these arguments. They seem at first sight not a little convincing: and, coming to us with the sanction of a great name, they would have been worthy of our best attention, although they had been possessed of no other claims. But I believe that they are fallacious notwithstanding.

It will be observed that the sin is held to lie in the deception. I shall not be suspected of an intention to argue that there is no harm in a moral deception, but it may perhaps be asked on what authority the principles of ethics are in this case applied to æsthetics. The principles of ethics are founded (leaving revelation out of view) on the primary convictions of mankind, and I may assume that no one will commit the absurdity of claiming for æsthetics a higher authority. The very fact, then, that these imitations are so generally used and so much admired among an educated and a moral people, certainly affords the strongest possible presumption in their favour. As these primary convictions mainly lead men in the paths of morality, it is surely a sound conclusion that they cannot lead us far or permanently wrong, where any essential principle is involved, in matters of taste. But we shall pass from this point, and ascertain, as careful judges ought to do, on what side the best precedents can be quoted.

Now it is not unusual in disputed questions of taste—which means, of course, in all questions of taste—to appeal to the authority of the ancient Greeks, as the court of last resort, and I should be sorry to depart from a custom which, if not yet venerable from its antiquity, had at least the merit of being the fashion, until the taste for mediævalism to some extent

* Read at a meeting of the Society of Arts, April 6th. The principle of imitation in art lies at the foundation of the question whether photography is, or is not, a fine art; and although that branch of the subject is not considered here, we commend this abstract of Mr. Purdie's paper to our readers. We regret that its length compels us to abridge it.—Ed.

supplanted that for classic art. In appealing to them we may congratulate ourselves, and perhaps the ancient Greeks, too, that they do not live in modern times, for one of two things must have been the result of such a misfortune;—either we should have wanted that authoritative tribunal—the wisdom of our ancestors—before which we could bring our cases for ultimate decision, or they, the ancient Greeks, must have had an accumulation of suits which would have left the Court of Chancery altogether destitute of a reputation.

Did the Greeks then allow the principle of deception in art?

It is recorded of Zeuxis, one of the greatest painters of ancient times, that the birds came and pecked at the fruit on his canvas, while one of his rivals asserted that the boy who held the basket could not be equally well painted, else the birds would have been frightened away; of Apelles, that he painted horses so truthfully that animals of their own species greeted them by neighing. Whether these stories be more worthy of belief than that of Arion and his Dolphins, we know not, but the fact of their being related sufficiently proves that the wonderful people whose support we claim were not less alive to the power of painting than of music, and that the deceptive character of the former was reckoned one of its chief merits. In a trial of skill between Zeuxis and Parrhasius, the victory was adjudged to the latter, when his opponent, entering his studio, desired him to withdraw the curtain behind which he supposed his rival picture was concealed, the curtain itself being the picture; and Zeuxis gracefully acknowledged his defeat, saying his own picture had merely deceived birds, while the other had deceived men.

But we can appeal to an authority which many will regard with greater veneration than that of the ancient Greeks. Ornamental castings in bronze, iron, and other materials were universally employed during the middle ages, while the first use made of oil painting after its discovery in the early ages of the Christian era was to paint imitations of marble.

The work of Heraclius, a compendium of the arts as practised previous to his time, is supposed to have been written in the seventh century. In it we find elaborate instructions for preparing the surface of columns, and painting them in imitation of marbles, as if, too, this were the only artistic use to which the oil vehicle could be applied. In fact, precedents of all ages may be adduced to sanction the practice which our modern authors condemn. But it is not enough that we produce strong presumptive evidence, however conclusive that may be, in support of our views. Nor is it enough that we can appeal in their support to the practice at once of ancient and modern times. We must also show that they are just in themselves or that they rest on right principles. This we propose to do by the following method:—

1st. We shall shortly advert to that love of imitation in which the fine arts have their origin.

2nd. We shall state some cases in which deceptive imitations are admissible, as contrasted with those of a different class.

3rd. We shall name the qualities which give value to decorative appliances, and illustrate the subject by showing how far some of these fulfil the conditions required of them.

4th. We shall conclude by pointing out and illustrating the conditions which ought to regulate the use of surface coatings.

First, then, as to that love of imitation which lies at the root of the fine arts. All decorative art may be divided into three kinds with reference to its subjects, or the mode in which they are treated.

1st. The geometrical.
2nd. The conventional.
3rd. The purely imitative.

Examples of the first class are to be found connected with every style of architecture. Almost all moresque ornamentation is geometrical, and the Greek fret may be named as affording an example of the style.

The second class, or conventional, takes its place midway between the other two. It is imitative after a fashion, through which—although natural forms are not directly imitated—the spirit of the form imitated is retained, as a melody in music, in the variations which are composed upon it. The most perfect examples of conventional ornament are, perhaps, the lotus of the Egyptians, and the honeysuckle of the Greeks. All architectural ornament may be said to be either geometrical or conventional, or a combination of the two.

The third, or purely imitative art, includes the painting of the human figure, of landscape, fruit, flowers, and all cases in which a direct representation of the object is attempted.

We cannot afford time to treat this subject fully, nor have we anything to do in the present discussion with geometrical or conventional ornamentation. Our attention will be restricted to the third class which we have named, as it is only in the exercise of purely imitative art that the questions now proposed for discussion can arise.

(To be continued.)

Correspondence.

FOGGING OF TANNIN PLATES.

Dear Sir,—Seeing so many remarks made about the fogging of tannin plates, under an alkaline development, I thought I would give you my experience in that line. I offer nothing new, but have to say that I can obtain moving figures with a 6-in. focus, ¼ size lens, of C. C. Harrison's make, with stop ⅛ in. diameter, under the following formula. Collodion, after a receipt from the News, in which is contained iodine of cadmium, bromine, ammonia, and acetic acid. It is a French formula, containing a large proportion of ether. I cannot lay my hand on the formula at the moment, but it will be found in the back numbers of the News.

Bath.

Water	24 ounces.
Nitrate silver	960 grains.
Glacial acetic acid	2 ounces.

The plates to be well washed, and laid in the tannin solution three minutes, and set up to drain and dry.

Tannin	15 grains.
Glycerine	3 drops.
Water	1 ounce.

After exposure, wash the plate so as to wet it well, and develop as follows:—

No. 1.

Water	1 ounce.
Pyrogallic acid	2 grains.
Glacial acetic acid	¼ ounce.

No. 2.

Alcohol	1 ounce.
Pyrogallic acid	10 grains.

No. 3.

Water	8 ounces.
Saturated solution of bicarbonate soda ...	1 ounce.

After the plate is wetted, I take half an ounce of water, a few drops of No. 2, and flow it over the plate, and then add some of No. 3, and again flow over the plate; and if not sufficient, I add more of No. 3, till the picture comes well up in all the detail by reflected light. Be careful in not bringing it up too far. Then wash, and take half an ounce of No. 1, and flow the plate, and then add a single drop, and more as required, of a silver solution made as follows:—

Water	1 ounce.
Nitrate of silver...	30 grains.

And fix in hypo.

It may be thought that so much acid in the bath would be anything but favourable to quick action, but the results prove different; and you have the satisfaction of every plate being sure, and no kind of fog, streak, or stain. I have made hundreds of plates, and I must say the above is the only formula in which I have a firm reliance. Jex.

Detroit, March 20, 1864.

[An excellent instantaneous marine view accompanied this letter, to illustrate the capabilities of the process.—Ed.]

A PHOTOGRAPHERS' RELIEF FUND AND CHEAPNESS IN PHOTOGRAPHY.

Dear Sir,—In accordance with your suggestion, I beg to offer a few remarks. Firstly, I fully endorse Mr. Beattie's observations as to an examination before admission to any

benevolent fund or provident institution. It would be the only guard against the numerous Tom, Dick, and Harrys who now practice our noble art, and who, by their debasing productions, tend to lower it and to make it "cheap." As a practical photographer, in order to avoid and soften down many of the rubs and occasionally serious knocks and accidents which one meets with in daily life, I have taken the precaution to insure myself in the Accidental Death Insurance Company, the only company on a *moderate* scale in which a photographer or working man can get a remuneration in case of accident during life, and a sum at death in case it should have been so caused. But this does not meet the case in question. A fund is wanted from which aged and deserving photographers may obtain assistance in time of need. Misfortunes arise from various sources, and none are more prone or liable to accident than the hardworked, practical photographer.

As, however, nothing can be done without a movement at headquarters, I would suggest that some leading photographer, such as Mr. F. Bedford, do call a meeting of his *confrères* in London, and carefully consider the matter. The fact is apparent to all, that while other professions have their provident institutions, *we* are without.

Thus, an institution founded upon these principles would be a bar to the very cheapness which is now our bane; and we should obtain a firmer and more social standing in society. —I am, dear sir, yours faithfully, W. H. Warner.

PRICES AND MERIT, THE RANK OF PHOTOGRAPHERS.

Dear Sir,—As a professional man, I have read with interest the various letters of your correspondents on low prices; but, price should have some reference to merit. I observe that "T. P. E." has somewhat anticipated me, in hinting at a remedy, which, but for other engagements, I should have suggested two or three weeks since. I allude to public examinations and certificates. What I feel, sir, is, not simply that prices are reduced to too low a point, but that, as one of a class which should be composed of men of education and refinement, there is no broad sign to the public eye to distinguish me from men who are an abomination to the profession, and who would be a disgrace to the lowest handicraft trade—such men as showmen, bullies, *et hoc genus omne*, who have perforce turned photographers. Sir, the very name seems to be a disgrace, when such men are included in that too loosely comprehensive word.

Now, I think that you will have no difficulty in agreeing with me, that before a man should occupy a gallery, and place himself before the public to solicit their patronage as a portraitist, he should be possessed of the following qualifications:—

1st. He should understand something of art; should have a general knowledge of what constitutes a picture, be it a grand composition, a landscape, or a portrait, but most especially the latter; that he should know in what the beauty and truthfulness of a portrait really consists, in order to have a proper standard to work up to; and that he should at least be acquainted with the masterpieces of portraiture which have been placed before the world, from the time of Bellini to the time of Reynolds and Lawrence, to say nothing of more modern names—for had he never thought of representing the human face divine until the camera drew it for him ready to his hand, how *is* he to know what to aim at, what to produce, how to put a soul into his otherwise "soulless camera," and to make it speak as he wishes it—if he has no thought, no idea, on the subject, but just takes an elevation, as an architect might say, of any face placed before him, and leaves everything to chance; it is the sitter, and that is enough for him!

Then, sir, secondly, he should have a knowledge of chemistry in general, and a particular knowledge sufficient to enable him to control his picture—always supposing he has some ideas on the subject to control.

3rdly. He should for the same reason have a knowledge of optics, and the obvious laws of light.

4thly. That he should be a practised manipulator, with a proper mechanical control over his handiwork.

5thly. That he should be a gentleman in mind and manner, one to whom his sitters can look up to, and allow to overrule their sometimes foolish fancies, and being a gentleman (an honourable man is of course implied), he cannot be a trickster, a *sharp* man, or what in medical parlance could be called a "quack."

Now, sir, if you grant me these five points, I wish to know who is to decide on them with authority? Why should not a photographer take out his diploma? Why should not M.R.P.S. (Member Royal Photographic Society), or P.P. (Professional Photographer), or A.P. (Associate Photographer), be an honourable object of ambition, just as R.A., or A.R.A., is to our artists. Could not our chief society take a more practical turn, be fully incorporated, and grant diplomas, and certificates of different degrees of merit after due examination?

These degrees, which, if not of legal weight, might be of great professional utility, and the fees paid might perhaps assist in another object advocated in your columns. I mean a photographers' fund for relief, &c. As to our touting friends, they might perhaps be *compelled* to take out a police licence as a security to keep the peace.

I know personally that I hold a far different position, inwardly and outwardly, to your showman photographer, with a kindred bully at his door; but Smith, who just drops into my studio for his portrait, is apt to confound me with the said showman, and I have nothing to show to convince *him*. It may be said talent will raise you above all such people. It will not, my dear sir; you know the poet says:—

> "Full many a gem of purest ray serene,
> The dark," &c., &c.

And Smith would as willingly (perhaps more so) pay his guinea or half guinea to the blusterer as to me, and, unfortunately, the public is made up of many Smiths.

As the art stands at present, any ignoramus who has a little money at command, and plenty of impudence, can take a gallery, show very good specimens purchased for the occasion, or fraudulently obtained, and forthwith rank himself a first rate photographer. Thus, neither the public nor honest men have any security. From the very newness of the art, there has been as yet no steps taken to associate and hold together our most respectable men; but the novelty has now worn off, and its practical men, in self-defence, require some outward standing, and some guarantee to the public of who they are, and what they are. Of course, one would not for a moment suppose that our Claudets and Mayalls require a diploma, though they would doubtless be among the very first to obtain and value such a mark; but other men of less note do require, and should seek to obtain some such token. The best practical way to carry out such an object, I leave with you and your intelligent readers; merely giving you my ideas for what they are worth; but I fear I have already trespassed too much on your valuable space, so must ask your pardon and indulgence. J. D. B.

WILLIAMS'S REVOLVING WASHING APPARATUS.

Dear Sir,—I am a constant reader of the Photographic News, and have seen in it much useful information and suggestions at different times, which have been of great service to me, and, I hope, to many others following the photographic art.

In vol. vii. No. 259, page 403, is an article, entitled "By what Means can the Art of Photography become a Science." The question occurred to me, What good can I do? Having a portrait of the late Prince Consort in my album, which has turned yellow through the effect of the hypo, I thought it was too bad to see it gradually fade away, and asked myself, Cannot something be invented to thoroughly wash the prints from

that deadly enemy, the hypo? From that time, it has been my study, and I am glad I have succeeded in bringing before your readers a complete washing apparatus, and hope that I am not taking too much space in your valuable journal with the accompanying description of the apparatus:—

My object was to produce a self-actiug apparatus with which any number or size of prints could be washed in the most efficient manner, iu the shortest possible time, without further attention or trouble, after placing them in the trough, and I think I have succeeded. The smallest stream of water will keep the drum of the trough in constant motion, and secure a continual change of water and variation in the place and position of the prints, without the slightest risk of injury. The apparatus consists of two zinc troughs, in the largest of which is a perforated drum of wood. Around this drum is a series of buckets to receive the water from the supply pipe, which is placed on one side of the drum; so that, as the bucket on the side becomes filled, the weight of the water alone in the bucket causes the drum to revolve. The smaller trough is fitted with a drum and buckets similar to the larger one. The buckets on the small drum are filled by the wasto pipe of the larger trough on the other side, by which means double the weight and power of water is obtained. The two drums are connected together by large and small cogwheels, by which an easy, regular, and constant motion is imparted to the drum revolving in the water iu the large trough. The large trough being filled with water to the height of the waste pipe, the drum is half full of water, into which the priuts are put. The revolving motiou given to the drum by the fall of the water into the buckets on the outside, causes a continual change of the position of the prints, and thus ensures their thorough washing, without injury, or atteution of any description. The drum in which the prints are placed, being perforated and suspended above the bottom of the trough, the heavier chemical water is passing off through the syphon-like waste pipe at the bottom, as fast as the pure, clean water is entering the trough from the buckets at the top, so that the prints are never allowed to rest in the impurest water. Thus ensuring the most certain and expeditious cleansing from the hypo. The drums can be easily removed, and the troughs used for washing the free nitrate of silver from the prints before toning, and for washing after toning, previous to being immersed in the hypo.

The machine can be seen at Mr. Hughes's, and at Simmous and Company, as announced iu your advertising columns.

Believe me, dear sir, yours respectfully, Geo. Williams.

[We have seen Mr. Williams's ingenious apparatus in action. All that continued change of water, and constant motion in the prints, can do to secure a rapid elimination of the hyposulphite, is effected here by a very comparatively small supply of water, and with very little trouble.—Ed.]

Photographic Notes and Queries.

Noverre's Dark Tent.

Sir,—I have seen in the last number of the News a plan and description of a tent by N. L. Noverre. This tent can hardly be considered new, either in general plan or details. It is almost identical with one invented and constructed by me about ten years ago. I soon, however, made very important improvements in it—such as having the top nearly circular, made in three segments to fold up. I found three legs did not give sufficient firmness. I therefore adopted six legs, arranged as in a double camera stand. This gives great firmness without adding to the weight, as the legs may be made much slighter.

Another improvement is that in my tent the legs spread out at the base to a distance of about six feet, which gives great firmness to resist the wind and ample room to work plates 20 inches square and upwards. I have had this tent in use nearly ten years, and it has been seen by hundreds. One person can put it up or take it down in less than three minutes.

I should be most happy to exhibit this tent at any meeting of the society.—Yours, &c., C. Springham.

April 11th, 1864.

Talk in the Studio.

Mr. Toovey's New Lithographic Process.—Mr. Lewis, of Dublin, calls our attention to the fact, that the transfer process recently patented by Mr. Toovey, and which, as we explained last week, was published in our columns on August 9th, 1861, was really patented by Mr. Lewis on the 3rd of the same month, thereby becoming his property. This is another singular illustration of the same idea occurring to different persons at the same time, without any communication between them. Mr. Hannaford had mentioned the idea to us some time before, but it was not published, and Mr. Lewis and Mr. Hanuaford, were unacquainted.

The Magnesium Light.—We have received from Mr. Johnsou, the courteous Secretary of the Photographic Society of Scotland, a portrait of Sir David Brewster, its venerable president, the negative of which was produced by the aid of the magnesium light, with an exposure of sixty seconds. The portrait is excellent and entirely free from any constraiut in the features, or other indication of the presence of a distressing light. The photograph is also good, the face being round, soft, and well modelled. The strongly marked cast shadows would probably be objected to by many photographers, but in this instance they add force and aid materially in the production of artistic effect. The black drapery is a trifle under exposed, or perhaps it would be more correct to say that the light being concentrated on the head, the drapery has scarcely received its full share. The picture being vignetted cleverly, however, renders this defect scarcely apparent. The photograph was taken, we believe, by Mr. Moffat, of Princes Street, Edinburgh.

Testing Chloride of Gold.—We have a final word to add to our recent remarks on testing chloride of gold by means of alcohol. In reference to "absolutely dehydrated alcohol," uot being an article of commerce, we are informed by one firm that it is so far an article of commerce, that hundreds of gallons of alcohol of sp. gr. ·794, pass through their hands every year. We have also to add, in reference to the use of chloride of calcium, with which a contemporary writer stated chloride of gold was largely adulterated, an able chemist, who has devoted much of his attention to this especial branch, informs us that chloride of calcium is uot only never used for such a purpose, but that it cannot be, for the simple fact that chloride of gold cannot be crystallized in combination with chloride of calcium.

Garibaldi and the Photographers.—The liberator of Italy, it is stated, has a horror of being photographed. A daily paper describing his kindly manner and accessible character to all around him whilst staying at Brook House, says:—"Photographers alone has he shunned with a mortal dread; and if he ever runs away from anything it will be from a focussed lens. One pertiuacious practitioner, with an apparatus on wheels, has implored permissiou to lie in weight for the General at the lodge, and, catching him as he came forth, to get him, 'only for five seconds,' in an attitude. Others, of a higher grade in the art of photography, have resorted to expedients almost as low; and at length the object of their importunities has asked, 'Can't they all do it at once?' This being impracticable, he has succumbed in a single instance, but no earthly consideration could induce him to let his head be fixed in the mechanical 'rest.' The photographer selected was Mr. Mayall, whose high reputation justified the choice."

Burning Magnesium Wire.—A curious experience occurred to one of our correspondents in attempting to burn magnesium wire. The wire was held by a pair of pliers, and persistently refused to ignite; but on being held by a piece of wood, it ignited at once, emitting its usual brilliant light. The experimenter was disposed to attribute the circumstance to some electrical action set up between the magnesium and the iron. We think a simpler and more probable explanation may be found in the fact that a short piece of wire held by iron pliers very rapidly conducted off the heat applied, and so prevented ignition. Wood, being a bad conductor, allowed the heat to accumulate, and produce incandescence.

Nitrate of Soda.—Mr. Sederstrom, a correspondent in Capo Town, sends us an interesting group of prize negroes captured by H.M. steamer Rapid, says: "Having noticed various articles in the News against the nitrate of soda bath, I have used the bath for some time, and have not met with any failures as described by several of the correspondents. The photographs

I send were made as follows:—Sensitizing solution being nitrate of soda, 80 grains; silver 35 grains to the oz. water; toned by phosphate bath, and fixed in hypo 6 to pint, never used twice."

To Correspondents.

Camera.—The field covered by a lens does not depend upon its diameter, but on the length of its focus. A single lens of 4½ inches focus, and 1 inch diameter, will answer very well for stereoscopic purposes, if you use a small stop; but, as a rule, it is better to have the focus a little longer, in order to secure a well-defined picture in every part. It is probable that the first mentioned will be best.

David Duncan.—Received with thanks. It shall have due consideration. We think there will be no difficulty in transferring pictures by Mr. Swan's process to ivory, and so securing very fine results.

Jex.—In both cases, No. 2.

Walter Woodbury.—We are glad to hear from you in your new position, and shall be glad to hear of your success. The picture forwarded is charming. For registration, please communicate with our publisher. We have handed him the picture and stamps.

A Reader of the News.—We imagine that cloth backgrounds, if carefully kept, are least liable to injury from rolling up. A background painted in oil and flatted, if properly done, ought to answer the purpose well. Soap flatting, the recipe for which was given on page 165, vol. v. of the Photographic News, will answer well. Distemper, if well done, should not crack; but it is more liable to injury than the others we have mentioned.

J. A., Coleford.—It is probable that by this time your difficulty has vanished. The milky turbid appearance was due to iodide of silver in suspension. If iodide of potassium be added in excess in the strong solution first made, it will be dissolved; but on adding water to dilute the solution, the weakened bath will not hold in solution the amount of iodide of silver formed. As a rule, it is precipitated, or easily filtered out, but at times it is a state of such fine subdivision as to pass through the filtering paper, and defy immediate efforts to clear the solution. In such case, standing a few days generally effects the purpose. Placing the solution in the sun aids the precipitation. We regret that we cannot answer private letters on these subjects. Our absolutely imperative correspondence is so large that it is in constant danger of getting into arrears.

G. Wilton.—You do not state sufficient of the history of your bath to enable us to judge satisfactorily of the reason for its inactivity. If it contain 15 grains of chloride of gold, and have only toned two dozen card pictures, the gold cannot possibly be exhausted. Is there any dark precipitate in the bottle? If not, the gold is still there in solution. Try making it, or a portion of it, decidedly acid with hydrochloric acid, next adding carbonate of lime until it is again neutral, and then try it again. Read the article on toning baths in our Year-Book.

B. W. S.—It is probable that the fault is a divided one, arising partly with the collodion and partly with the varnish. The same varnish will probably not produce the same effect on another sample of collodion, and the same collodion will probably be free from the defect with an amber or benzole varnish. In the meantime, if you apply a dilute solution of gum arabic to the negative before it is dried, your varnish will then not injure the film. 2. When you find it difficult to obtain sufficient intensity, apply a solution of iodine 1 grain, iodide of potassium 2 grains, water 1 ounce; expose to light, wash, and then intensify with pyro and silver. 3. The chief reason for the film leaving the glass when dry is the use of imperfectly cleaned glasses.

George Verey.—There are no defined conditions which prescribe the exact duties of each person in a photographic establishment. As a rule they are either the subject of specific or understood agreement, an employer generally stating at the outset the duties for which the assistant is required. We should conceive the general duties of an assistant operator to consist in cleaning glasses and vessels, or seeing that they are cleaned; in seeing that there is always a supply of collodion, nitrate bath, developing solution, &c., in good condition ready for use; in coating and exciting plates; pouring out a fresh supply of developer into the developing cup ready for use; fixing the negatives and occasionally developing one; washing, drying, varnishing, numbering and forwarding them to the printer; keeping the dark-room and its contents in order; in a small establishment occasionally assisting in printing, mounting, &c. In short, he will best consult his own interest in making himself generally useful in performing any photographic duty he can, and which he may be required to execute. The more skilful he is the higher will be the duties for which he is required. The hours of photographers are decided chiefly by custom, probably averaging the year round from 8 or 9 in the morning to 6 in the evening.

D. Campbell.—Dust would produce transparent spots. We are not familiar with those you describe; the manufacturer of the plates can probably best explain the cause. We do not think the camera likely to be the source of such spots.

W. R. P. J.—There are many causes of insufficient density in the negative. It may proceed from the collodion, the bath, the developer, the light, the temperature, or a combination of these causes. If your bath contain much nitric acid, that will cause it. If your collodion be thin and new, that will cause it. If your developer be too strong, sometimes that will cause it. But whatever the cause, by availing yourself of the various modes of intensifying described in our Year-Book, you may generally succeed in getting density enough.

A. Stevens.—There is no contradiction in the formulæ to which you refer. The difference in aim and in other conditions may readily reconcile apparent discrepancies. Whenever the object is to secure the shortest possible exposure, a strong developer will be used; and if the light be good, and other circumstances favourable to intensity, the strong developer will give a very harmonious negative. The stronger the developer the less the proportion of acid necessary. On the other hand, where the object is to secure a vigorous negative at one operation, without further intensifying, a weak or moderate developer, with a large proportion of acid, will be used. The sugar of milk will tend to give a more organic character to the image, and render it more non-actinic. Read our recent paper on "Iron Developers," read before the Glasgow Photographic Society.

G. B. Shepherd.—Your glass is not perfectly good; it might do for a dull light, but if any sunshine or bright light reached the window, sufficient would pass through to fog a negative.

T. R.—The process described by Mr. Hart is only applicable to chloride of silver. For sulphide, you must adopt the course described in our Year-Book for the purpose, using sufficient heat and sufficient nitrate of potash to burn off the sulphur, and putting a little of the residue at a time into the crucible. We are glad to receive the promise of your support for the Relief Fund. We do not intend to let the matter fall through if we can help it.

W. G.—The rule for increase of exposure with the same lens and smaller diaphragms is very simple, the exposure increasing in the direct ratio in which the square of the aperture decreases. A stop of half an inch requiring four times the exposure of a stop of one inch. Some makers so arrange their stops that each progressive size smaller requires double the exposure of the last. This rule is not, however, absolute in its application. 2. It is impossible to decide the proper exposure from a description of the circumstances; if everything be in good condition, a very few seconds ought to be sufficient in the circumstances you describe. 3. You will find bromo-iodized collodion with iron development the most easy to work, and generally most rapid.

C. Spaingham.—We shall have much pleasure in introducing you to any of the societies to exhibit your shutter, or in exhibiting it ourselves if you cannot attend. If we can spare the time, we shall have pleasure in calling upon you.

J. W. Weia.—Communications on the subject of registration should be addressed to the publisher. Search for a registration of which the date is not given, would involve an amount of labour difficult to undertake.

T. S.—Your pictures are very good. We are uncertain of the cause of the spots to which you refer.

J. W.—We see no reason to doubt the legality of Mr. Swan's patent. If he has not used new materials, he has used them in a new manner, and produced a new combination, and obtained a new result. We shall have something to say on the subject in our next.

Peter Griffiths.—Burn the waste prints and all clippings of silvered paper. You will easily obtain the silver from the ashes. See full particulars in our Year-Book. Should you require more information, write again.

Photos.—Alcohol is the solvent of the Sœhnee varnish. Methylated spirit will serve for softening the varnished film.

W. H. Barton, E. Aldis, and several Correspondents in our next.

Articles upon the "Relief Fund, Photographic Diplomas," &c., "Does Photography Reproduce Faithfully," and some other subjects, together with some correspondence, are compelled to stand over until our next.

Photographs Registered during the Past Week.

Mr. John Keens, Newall's Buildings, Market Street, Manchester,
- Two Photographs of Rev Mr. Smithson.

Mr. Philip Parsons, Kenilworth Road, Leamington,
- Photograph of the Interior of Stratford-on-Avon Church.
- Photograph of Shakspeare's Monument in Stratford-on-Avon Church.

Ma. Thomas Tyley, 28, Trinity Street, Bristol,
- Photograph of Monument in Memory of Rev. Edward Byam, in Castle Lyons Church, Ireland.

Mr. James Wood, Burnley, Lancashire,
- Photograph of two celebrated Heifers, named the Venus Butterfly, and the Vilantes Butterfly, the property of Colonel Townley.
- Photograph of a celebrated Bull, named the Royal Butterfly, the property of Colonel Townley.
- Photograph of the Ring at the time of sale of the celebrated Butterflies (heifers), the property of Colonel Townley.

Ma. William Leng, Whitby,
- Photograph from Oil Painting.

Messrs. Simm and Forrester, Glasgow,
- Photograph from Bust of Right Rev. John Murdock, D.D.

Mr. R. H. C. Ursdell, 1 Green Road, Portsmouth,
- Photograph entitled, "Great Volunteer Review at Blackheath March 28th, 1864."

Ma. Wm. Geo. Ginson, 83, North Marine Road, Scarborough,
- Two Photographs of Rev. T. Greenbury.

Mr. W. Woodbury, 60A, Market Street, Manchester,
- Photograph of Miss Melvin, of the Theatre Royal, Manchester, as Cupid, in "Ixion."

Mr. H. A. Taylor, Wright's Court, Market Street, Manchester,
- Three Photographs of Rev. Father Ignatius, O.S.B.
- Two Photographs of Rev. Father Ignatius and Brother Gregory Noviu, O.S.B.

Ma. John Robert Sawyer, 46, London Street, Norwich,
- Photograph of Rev. H. Temple Frere.
- Photograph of Rev. Bircham Houchen.
- Photograph of Rev. W. W. Andrews.
- Photograph of Rev. J. F. Osborne.
- Photograph of Rev. A. N. Delafosse.
- Photograph of Rev. F. Meyrick.

Mr. John Stuart, 120, Buchanan Street, Glasgow,
- Four Photographs of Rev. Alexander Rankin.

Mr. John Patrick, 71, High Street, Leven, Fife,
- Photograph of Sir Robert Anstruther, Bart.

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth,
- Photograph of Sir Edmond Lacon, sen. (from oil painting).

Mr John Frew, 7, Railway Terrace, North Shields,
- Photograph of Henry Johnson, of Kettlewell School, North Shields.

Mr. J. Margetts, 12, Prospect Place, Kingsland, N.E.
- Photograph of Rev. Clement Dukes.

All Communications for the Editor to be addressed to 32, Paternoster Row.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 294.—*April* 22, 1864.

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MR. SWAN'S PATENT CARBON PROCESS.

Is Mr. Swan's patent valid? will it, beyond question, preserve to him and to his licencees the sole right to work his process? These are questions which have been very frequently asked since the reading of his paper at the last meeting of the Photographic Society. Photographers have so frequently met with photographic patents which were untenable, and it is so difficult to patent a *process* at all, that these inquiries are by no means unnatural, and if pursued in an honest spirit, by no means necessarily unfair or antagonistic to the patentee, especially when promulgated before he has made his final specification and sealed his patent, as they enable him to amend weak points in his provisional specification, or if it turn out that the idea has, unknown to him, been published before, he is enabled to abandon further proceedings before he has incurred any serious expense.

We are especially bound, in any case, as having the confidence of so large a constituency of photographers, and as, being conservators of the general claims of photography, to give full effect to such inquiries. No individual interest can, with us, for a moment be permitted to interfere with the common rights and common benefits of all concerned in the practice and progress of the art. When, some months ago, Mr. Swan consulted us as to the proper course with his invention, before we knew its details, remembering the difficulty of protecting any process, and the especial difficulty of establishing a claim of entire novelty with regard to any photographic process; fearing that by a patent he might place himself in a position of antagonism to photographers, which might lead to much litigation, and knowing how foreign such a position would be to his feelings and character, we advised him against taking a patent. We are bound to admit, however, that when he first brought his process in its full details under our attention, we at once stated our conviction that a patent was both tenable and justifiable, and had pleasure in at once addressing ourselves to that part of the consultation which issued in Mr. Swan's resolve to place the process in the hands of photographers on terms of liberality, which can in no way restrict the use of his process amongst amateurs, and which limits his advantage to an infinitesimal portion of the profit gained by others from his process. Let us, however, glance for a few moments at the claims of his process for the protection of a patent.

When the question was put at the conclusion of Mr. Swan's paper at the Photographic Society, as to what was the novelty he claimed in it, it occurred to us that the question might have been answered very conclusively in very few words. Mr. Swan might simply have answered, "I claim the process which has produced the pictures before you." With such specimens in hand, it would have been vain to gainsay the novelty of the process. It is very easy to say that one part of the process has been suggested before, and that another has been tried before; but it was impossible to say that such results had been produced before, or that the combination of materials and method which had produced such results was not, in the very essential point of efficiency, quite new.

Mr. Swan's specification is not, and, of course, cannot be for some months, published; and we do not now at all undertake to speak in his name as to the points claimed as a specific ground for protection. But it is clear that no part of the materials involves a claim of novelty. As early as 1855, M. Poitevin patented a process for using gelatine, a bichromate, and carbon, for producing photographic prints. Two years later, M. Beauregard patented a process, using the same materials, but varying the mode of application; and he suggested indian ink, alone or with other pigments, as the form of carbon to be used. MM. Salmon and Garnier, Mr. Pouncy, and various other photographers, rang changes upon these and similar materials; but still the great desideratum remained; a process which should give proper gradation of half-tone was still required.

The first to publish any solution to the difficulty and explain upon what principle alone half-tone could be secured in such processes, was Mr. J. C. Burnett, and, from his comprehensive suggestions, it is stated that arguments against the validity of Mr. Swan's patent may be drawn. As to the principle upon which half-tone is based, we will quote Mr. Burnett's own words in a communication to the *Photographic Journal*, November 22nd, 1858. After describing that the possibility of producing half-tone depends upon the power of the light "to penetrate with a certain degree of facility the mixture of pigment with bichromate and gelatine, or gum, the gelatine or gum being, in consequence, rendered insoluble to a greater or less depth on different parts of the picture, according to the varying depth to which the actinism has been allowed or had time to penetrate," this, of course, being dependent on the varying gradations of the negative. He then goes on:—

> But to render this action practically available for the obtaining anything like half-tones by simple water washing with carbon or pigments insoluble in that fluid, there are these two essential requisites:—1st. That the mixture of the pigments and bichromate should not be too impermeable to actinism (and for this reason, it would appear that many other substances, particularly blue pigments, as cobalt blue, prussian blue, or indigo, might be more easily workable with the pigment). 2nd. That in printing, the paper should have an *un*prepared side, and not its prepared side, as in ordinary printing, placed in contact with the negative in the pressure frame, as it is only by printing in this way that we can expect to be able afterwards to remove, by washing, the unacted-upon portions of the mixture. In a positive of this sort, printed from the front or prepared side, the attainment of half-tones, by washing away more or less depth of the mixture, according to the depth to which it has been hardened, is prevented by the insoluble parts being on the surface, and, in consequence, protecting the soluble part from the action of the water used in washing; so that

either nothing is removed, or, by steeping very long, till the inner soluble part is sufficiently softened, the whole depth comes bodily away, leaving the paper white.

Thus the principle upon which half-tone is obtained, is here very distinctly set forth, but no detailed *modus operandi* is given. In the following February, however, the same gentleman refers again to the subject,, and remarks that printing on paper prepared with the sensitive gelatine and carbon, from the back of the paper, involved very long printing and loss of delicacy from the grain of the paper, through which the printing had to be effected. He adds, therefore, that this may be avoided by "printing on glass, sheet gelatine, or similar media," and it is on this suggestion, we believe, opponents of the patent would base their opposition. It is to be observed of this, however, that it is a crude suggestion, the difficulties of applying which would become very apparent on attempting to put it into practice; and that not only no hint of the mode of applying it is offered, but no intimation is given that the experiment had ever been tried, still less that it had succeeded.

The first practical application made, we believe, of this suggestion, was the process of M. Fargier, which might, however, possibly be the result of an independent idea. This was patented in the latter part of the year 1860. The mode adopted was as follows: a plate of glass was coated with a mixture of carbon, gelatine, and a bichromate. This was exposed under a negative, not through the glass, but with the film next the negative. Instead, however, of attempting to wash away the insoluble portions from the surface, the gelatine was now coated with collodion to protect the surface from the action of the water. The whole was next plunged into water, which detached the film from the glass, and allowed the insoluble gelatine to be washed away from the surface which had been furthest from the negative, so preserving in contact with the collodion the finest gradations of half-tone. This film of collodion, with an image in gelatine and carbon, had now to be attached to paper—by no means an easy task. The process gave some very fine results; but the trouble of catching a floating film of collodion, and mounting it satisfactorily, was an insuperable barrier to the extensive practice of the process.

Mr. Pouncy's ingenious process was the next application of the principle, but it, of course, is essentially different from Mr. Swan's method. There are also various other carbon processes, the details of which, however, in no wise affect the question of Mr. Swan's patent.

It is clear, however, from the brief summary we have cited, that Mr. Swan will not claim any novelty in the materials. Bichromates, gelatine, sugar, indian ink, and collodion have all been used before. The principle of securing insolubility in some of these agents by the action of light is, of course, as old as photography. The principle of securing half-tone by printing from the back of the medium on which the sensitive coating might rest, was, as we have shown, published nearly six years ago. Further, as will be seen from a letter in the present number, the method of supporting a sheet of gelatine upon a film of collodion was suggested by Mr. Beattie in our columns little more than six months ago. But with all this, no definite idea of a practical process of applying the principles and combining the materials seems to have existed until Mr. Swan published his process. It is upon such a practical combination of the materials as yields successful results — results which unquestionably surpass everything which has been done before—that we apprehend the validity of the patent will rest. It is very probable that the new tissue itself might be patented. It is a new combination of collodion, gelatine, sugar, bichromate, and indian ink, or other pigment, made into a sensitive tissue, capable of being handled and worked, so as to yield the desired result. It will probably be argued by some that there is nothing essentially different in this from the sheet of gelatine proposed by Mr. Burnett, or the sheet of gelatine and collodion proposed by Mr. Beattie; but there is really all the difference between answering the purpose, producing the result, and having done nothing of the kind. We all remember the very plausible argument—used in a certain action intended to limit the application of collodion in photography—to the effect that a film of collodion was, in fact, only a sheet of paper, which, in a sense, was undoubtedly true. In one case, cotton fibre was reduced to pulp by mechanical means, and spread into a sheet of paper; in the other, cotton fibre was by chemical means brought into solution and spread into a sheet of collodion. It was argued, therefore, that the patent which protected the process on paper would necessarily include that on collodion. Slight as the modification between the two substances was, it made all the difference between efficiency and comparative non-efficiency, and the argument attempting to establish their identity did not prevail. The difference between Mr. Swan's method and former methods is analogous at least in the point of efficiency, and we cannot have a doubt that if the patent rest on the capacity of the process to produce certain results as compared with the incapacity of other processes, then Mr. Swan has a legitimate claim to the protection the patent law affords.

Just, as it appears to us, the claims involved are, we should have felt but little satisfaction in stating them, if we had seen any probability that this patent would act as a clog to progress and improvement, or even in any way limited the commercial application of the process. With the contemplated arrangements this appears to be impossible. Amateurs and experimentalists, who have been so largely the pioneers of progress, are to have the unrestricted use of the process, so that all barrier to improvement is removed at once. Whilst from those who make a commercial use of the results of Mr. Swan's labours and experiments, he simply asks for a share of the profit equivalent to three-halfpence in the pound upon the charges of the highest class of portraitists, or fivepence in the pound upon the charges of the majority of commercial portrait establishments, supposing that in neither case any additional charge is made for the increased beauty and permanency of the results. The probability is, however, that the public will willingly pay an additional sum far exceeding the patent charge paid by the photographer.

DOES PHOTOGRAPHY REPRODUCE FAITHFULLY?

A somewhat comical question has been exciting attention recently in the literary journals, in some of which, the literal faithfulness of photographic transcripts has been denied. One astute critic, who has discovered that photography has been blamed unnecessarily, does not arrive at that conclusion because photography is guiltless of the errors charged, but because literal faithfulness was not to be expected from it. Photography does not, he says, give a re-presentation, but representation, words which, he very correctly remarks, are very far from synonymous. The distinction is in this case, however, a very unfortunate one; for it is a re-presentation in its most literal sense, which photography does give. The painter, when he treats a subject, gives a representation of it; and his work will rather present the painter's impressions of his subject, than an exact reproduction. Photography, on the other hand, literally re-presents or reproduces all that concerns form: with the exception of colour, it yields a literal *fac simile* of whatever is placed before it.

The origin of this discussion is a discovery made by a critic in the *London Review*, that the photolithographic reproduction of the first folio edition of Shakespeare, which we recently noticed, departs, in a few instances, from the text of the edition in the British Museum. A flagrant instance, which he mentions, is the transformation of the letter *e* into *c* in the word *care*, the old spelling of *car*, making it into *care*. The occurrence of a deviation of that kind would, to a common mind, have suggested a very simple solution. It might have easily been supposed that the horizontal hair stroke in the e had, from some slight imperfection in the transfer, not been put on the stone, or that by some accident

in cleaning the stone, it had been removed; or even that it was an accidental omission in that single impression, which might easily occur in lithography. But some people have a wonderful faculty of looking for an occult cause, when a simple and obvious one is perfectly explanatory, and these critics jump to the conclusion, that the error arises from some incapacity in photography to reproduce perfectly printed matter in black and white.

The explanations we have suggested would, of course, imply a certain amount of manipulative carelessness, or editorial neglect. Where imperfection in the transfer was possible, greater watchfulness on the part of the Editor became imperative. But accepting Mr. Staunton's explanation as the correct one, no manipulative shortcoming, no editorial neglect, no error of any kind exists. The critics have simply discovered a mare's nest. The broken *e*, which looks like *c*, exists in the Ellesmere copy, from which the negatives were taken, and in various other copies besides; so that, instead of a discovered weakness in photography, we have its literal faithfulness in reproduction vindicated, by the very error which has been seized upon, in order if possible, to fix a reproach upon the art. To any person with the slightest knowledge of photography, the idea that it could commit literal errors, or modify the text in copying, could never have occurred, and to our own readers it is unnecessary to vindicate its truth; but as, for some reason or other, our art is considered by a certain class of writers fair game for a sneer at any time, we are concerned to put on record a protest against, or a refutation of, false and foolish misrepresentations.

ON THE ACTION OF NITRATES, &c., UPON ALBUMENIZED PAPER.

BY GEORGE PRICE.

Judging from numerous conversations on the subject, I think there can be very little doubt, that were photographers asked, why the albumen is not removed from the surface of the paper by the act of sensitizing, the general, if not universal, opinion expressed by them would be, that it was because the compound formed by the chemical combination of nitrate of silver and albumen, known as albuminate of silver, *is insoluble*. I need scarcely say, that as such a reason would afford no explanation of why this insoluble compound is not precipitated in the bath, instead of being formed on the surface of the paper, it would virtually be no answer to the question proposed. I believe it is also generally considered, that the insolubility of this compound is due to the action of the nitric acid, which is one of the constituents of nitrate of silver. Now, the only logical deduction to be drawn from these opinions is this:—if the non-removal of the albumen from the surface of the paper be in consequence of the formation of an insoluble compound, and the formation of this insoluble compound be due to the action of the nitrate of silver's constituent nitric acid, *the retention of the albumen by the paper must also be due to the action of the nitric acid.*

It is very evident, that if the action of the nitric acid be the cause of the paper's retention of the albumen, a solution of *any other* nitrate would also produce an insoluble compound on the surface of the paper, *provided its constituent nitric acid were not less in quantity than that in the nitrate of silver.* However, after floating upon a solution of nitrate of soda, or ammonia, or potass, even if concentrated, a sheet of albumenized paper will not retain any visible trace of albumen upon its surface. Now, each of these nitrates has more nitric acid in its composition than an equal weight of nitrate of silver has; nitrate of soda having exactly *double the quantity*, and nitrate of ammonia *more than double*, and yet the albumen is removed from the paper. As chemists say that "albumenates of the alkalies are soluble in water," it perhaps may be assumed, that this removal of the albumen is in consequence of *soluble albumenates* being formed by solutions of these nitrates of the alkalies; and that the coagulating power of their constituent nitric acid is destroyed by the superior solvent power of their bases. However, chemists not only tell us that "albumenates of the alkalies are soluble," but they also tell us that "*all other albumenates are insoluble*," nevertheless, saturated solutions of the nitrates of baryta and of strontia also clear off the albumen, notwithstanding each of them has more nitric acid in its composition than an equal weight of nitrate of silver has. It perhaps may be advanced, that these are nitrates of alkaline earths, whereas, nitrate of silver is a nitrate of a *metal proper*. Well, saturated solutions of the nitrates of cobalt, copper, manganese, nickel, and zinc, clear off the albumen as effectually as solutions of nitrates of the alkalies and alkaline earths do; and yet *each* of those nitrates of metals proper has also more nitric acid in its composition than an equal weight of nitrate of silver has.

If the *solubility* of albumenates of the alkalies be accepted as a valid reason why solutions of their nitrates clear off the albumen, it would be tantamount to saying that a soluble albumenate could not be retained by the paper; but such a statement *would be contrary to fact*, for a saturated solution of nitrate of lead *forms a soluble albumenate upon the surface of the paper.* This is an extraordinary circumstance, for several reasons; it is, moreover, a very important fact, as it proves the fallacy of the theory which assigns the so-called coagulation of the albumen to the constituent nitric acid of the nitrato of silver, for we have here a nitrate with a larger proportion of nitric acid in its composition, and also having a metal proper for its base, forming a soluble albumenate, and forming it, too, upon the surface of the paper. A saturated solution of nitrate of uranium also does not remove the albumen, but the albumenate formed is *insoluble*, and yet the proportion of its constituent nitric acid is *less than one-third* of that in each of the nitrates of cobalt, copper, and zinc, whose solutions clear off the albumen.

Before proceeding further, let us show what these experiments tell us. They tell us the singular fact, that saturated solutions of the nitrates of ammonia, potass, soda, baryta, strontia, cobalt, copper, manganese, nickel, and zinc, clear off the albumen, although they each contain a larger quantity of nitric acid than an equal weight of nitrate of silver does. We thus have nitrates of the alkalies, nitrates of the alkaline earths, and nitrates of metals proper, all acting alike by clearing off the albumen. The paper's *retention* of the albumenate, when a solution of nitrate of silver is employed, *cannot therefore be due to its constituent nitric acid*, nor to its base being a metal proper; neither can it be due to the insolubility of the albumenate, as solutions of several of these nitrates also form insoluble albumenates, but form them *in the bath*, neither can the *removal* of the albumen by solutions of nitrates of the alkalies, be due to the *solubility* of their albumenates,* for nitrate of lead forms a soluble albumenate, *which the paper retains.* These experiments also disclose the fact that saturated solutions of the nitrates of uranium and of lead, do not clear off the albumen, although they have, each of them, *less nitric acid in their composition* than equal weights of any of the nitrates I have named, whose solutions *do* clear off the albumen.

These facts induced me to try what effect would be produced upon albumenized paper by the action of nitric acid *in a free state*, that is, uncombined with any base, but reduced to the same strength as the constituent nitric acid in a nitrate of silver printing bath. From Dr. Ure's tables, giving the quantity of anhydrous nitric acid in 100 parts of liquid acid of different specific gravities, I calculated what quantity of water must be added to a drachm of liquid nitric acid, specific gravity 1·45, to reduce it to the same state of dilution as the constituent nitric acid in a nitrate of silver solution of *twenty*, *thirty*, *sixty*, and *eighty* grains to the ounce. In practice, however, I omitted all minims under half a drachm, even if they amounted to *twenty-nine and a decimal;* and thus my diluted nitric acid was a trifle stronger than the solution of nitrate of silver which it represented. Upon floating albumenized paper upon these mixtures of nitric acid and water, the albumen was *removed* in every case, and no visible trace of it was left upon the paper, excepting by the representative of the *eighty* grain solution, and that only allowed a *very slight trace* to be perceptible. As photographers are not in any way interested in the behaviour of *normal albumen* with nitrate of silver, having in printing to deal with it only in a dried chlorided state, the theory which assigns to the action of the nitrate of silver's constituent nitric acid the so-called coagulation of the albumen, which takes place upon sensitizing albumenized paper, is, I believe, understood by them as also assigning it to be the cause of the *non-removal* of the albumen from the paper. If, therefore, the promulgators of this theory intended it to imply such a thing, their theory is proved to be *totally fallacious* by the facts I have stated. However,

* Presuming them to be so.

even should it be *denied* that it was intended to imply that the *retention* of the albumen was due to the action of the constituent nitric acid, but *only* that the so-called coagulation of the albumen was caused by it, their theory is equally *disproved* by the fact, that a solution of a nitrate having a *larger* proportion of nitric acid in its composition than an equal weight of nitrate of silver, forms a *soluble albuminate;* for, I presume, the formation of a *soluble* albuminate cannot, by any perversion of language, be called "coagulation," as coagulation is considered to be synonymous with *insolubility*, although insolubility is not consequently synonymous with coagulation.

The preceding experiments disclose some curious facts. Each nitrate that I have mentioned, with the exception of that of *uranium*, has equal atoms of base and acid, viz., *one of each*, and is therefore a *proto*-nitrate. The atomic weight of the *bases* of the proto-nitrates which I have stated clear off the albumen, are all of them *low*, in comparison with *oxide of silver*, which is 116. Thus *oxide of sodium* 31, *oxide of ammonium* 26, *oxide of potassium* 47, *oxide of barium* 76·5, *oxide of strontium* 51·8, *oxide of cobalt* 37·5, *oxide of copper* 39·75, *oxide of manganese* 35·5, *oxide of nickel* 37·5, and *oxide of zinc* 40·5; and, moreover, *the atomic weight of none of them*, with the exception of oxide of barium, *equals that of the nitric acid*, which is 54. In each of the proto-nitrates of lead, and of silver, whose solutions do not clear off the albumen, *the atomic weight of their base is more than double that of the acid; oxide of lead* being 111·5, and *oxide of silver* 116. Nitrate of *uranium*, is called *a nitrate of the sesqui-oxide*, and as its formula is U_2O_3, NO_5, it has also *one atom of acid;* the atomic weight of *uranium*, being 60, that of its *sesqui-oxide* becomes 144; and, therefore, notwithstanding the *low* atomic weight of uranium as compared with that of silver, the atomic weight of the *base* of its nitrate is *high*, being likewise *more than double that of the acid.* Although the nitrate of uranium is called a nitrate of the *sesqui*-oxide, we might perhaps have been excused if we had classed it as a *proto*-nitrate; for the theory of the formation of the uranium salts is, that the mono-atomic radicle *uranyl* (U_2O_3), is the base of the uranic compounds; thus, U_2O_3 represents (U_2O_2), O, which may be considered as being the formula of the *protoxide of uranyl*, this *quasi metal* having an atomic weight of 136; according, therefore, to this theory, the nitrate of the sesqui-oxide of uranium may be considered as the *proto-nitrate of uranyl.*

These circumstances led me to conclude that the retention, or non-retention, of the albumen by the paper, was in obedience to a definite law, which appeared to be to the following effect: —1st. If the atomic weight of the *base* of the nitrate in solution *be more than double that of the acid*—the base not being an alkali—*the albumen will be retained by the paper.* 2nd. If the atomic weight of the *base* of the nitrate in solution *be less than double that of the acid* the albumen will be *removed* from the paper, *whether the base be a metal proper or not.*

Judging from these experiments that the mere *solubility* of the albumenates formed by solutions of the nitrates of the alkalies,* could not be the *cause* of the removal of the albumen by such solutions, as a solution of nitrate of lead forms a soluble albuminate, *which the paper retains;* I wished to ascertain what would be the effect of a solution of *a nitrate of an alkali, whose composition was in accordance with the requirements of the first clause of the foregoing law.* Now, the alkali *cæsium* is the only one whose composition answers to this requirement; *cæsium* having the high atomic weight of 133, that of its oxide is 141, and as its nitrate is a *proto*-nitrate, *the atomic weight of the base is more than double that of the acid*, and therefore, if the preceding law be applicable to nitrates whose bases are *alkalies*, a solution of nitrate of cæsium should not clear off the albumen; however, I have been unable to verify whether this be the case or not, from inability to procure any of this nitrate owing to its *extreme scarcity.* I have also been prevented by their high price, from obtaining others which I was anxious to procure; thus, for nitrate of *osmium* I was asked *thirty shillings per drachm.* It happens that the composition of the greater number of the nitrates, in conformity with the second clause of the law I have promulgated, that is, *the atomic weight of their bases is less than double that of the acid*, as several metals with high atomic weights do not form nitrates.

According to the atomic weights at present assigned to them, *bismuth* has the highest atomic weight of any known metal, viz., 210; as its nitrate is a nitrate of the *ter*-oxide, and its formula—leaving out its water of crystallisation, $Bi\,O_3$, $3NO_5$, the atomic weight of its *base* is 234, but notwithstanding its being so high, it is nevertheless considerably *less than double that of the acid;* which becomes 162; a saturated solution should therefore *clear off the albumen.* When crystals of nitrate of bismuth are attempted to be dissolved in water, decomposition ensues, a copious precipitation takes place, and we obtain only an acid solution containing very little bismuth; but *this acid solution clears off the albumen.* Although decomposition is a consequent when water alone is attempted to be used as a solvent, none takes place if *citric acid* be present in it; and a saturated solution of nitrate of bismuth obtained by its aid, also *clears off the albumen*

It has been said, "there is no rule without an exception," and that, "an exception proves the truth of the rule." Now, *mercury*, from its peculiar physical properties, may be considered as *an anomalous metal*, and its nitrate being a nitrate of the *sub*-oxide, *its base has a deficiency of oxygen*, in comparison with the nitrates I have mentioned; it was, therefore, in this nitrate that *I expected to find the sole exception* to the law I have promulgated as appearing to regulate the retention or non-retention of the albumen, and upon procuring it I found my expectations as to its being an exception were correct. The atomic weight of *mercury* being 100, that of its sub-oxide is 208; the atomic weight of the *base* of the nitrate of the sub-oxide of *mercury*, is, therefore, more than *treble* that of the acid, as that is only 54; in fact, the proportion of base to acid *is higher than in the uranium nitrate*, but yet a saturated solution of it clears off the albumen. Query, whether the deficiency of oxygen in the base has aught to do with this anomaly? At present, I have not endeavoured to solve this question. I may as well mention that I deduced the foregoing law, solely from the action of solutions of the following nitrates, viz., of *ammonia*, *baryta*, *lead*, *zinc*, and *silver;* the other nitrates I have named, being procured at various times afterwards, in order to verify it.

I must now say a few words on nitrate of *thallium*, which I have only lately been able to procure. The atomic weight of *thallium* being 204, its oxide is 212; and as its nitrate is a *proto*-nitrate, we have even a *higher proportion* of base to acid than in the *sub-nitrate of mercury;* and, moreover, there is no deficiency of oxygen; in fact, *the atomic weight of the base of nitrate of thallium is very nearly four times that of the acid*, and yet a saturated solution of it *clears off the albumen.* However, this metal has *very peculiar properties*, and although classed with *lead* and *silver*, it has the characteristics of *an alkali*, and therefore, perhaps it might have been expected to act as such upon albumen; but I must confess that I was disappointed at the effect produced by a solution of its nitrate.

It is a singular circumstance that nitrate of *uranium* appears, from these experiments, to be the *only nitrate*, except nitrate of silver, *which will form an insoluble albuminate on the surface of the paper.* The paper's retention, or non-retention, of its albumenized surface when acted upon by solutions of nitrates, affords us no information of the effect that will be produced upon it by solutions of other salts with the same bases. Thus: —A saturated solution of *nitrate of lead* allows the albumen to remain on the paper as a soluble compound, but a saturated solution of *acetate of lead* clears it off. Again, a saturated solution of *sub-nitrate of mercury* removes the albumen, but a saturated solution of *proto-chloride of mercury*, known as corrosive sublimate, and formerly called *bi*-chloride, allows it to remain as an insoluble compound.

A solution of nitrate of lead, forming a soluble compound with the albumenized surface of photographic paper, opens a curious subject for discussion. We are told in Watts' Chemical Dictionary that "albuminate of lead is a white *insoluble* salt;" this albuminate is, however, "obtained by mixing solutions of albumen and *sub-acetate of lead.*" Here *normal* albumen and sub-acetate of lead is stated to produce an *insoluble* albuminate. Now, my experiments show that a *soluble* albuminate of lead is obtained by floating albumenized paper upon a solution of *nitrate of lead.* Here *dried* albumen is employed. This different action of one salt of lead upon *normal* albumen, and of another salt of lead upon *dried* albumen, discloses a strange anomaly. *One-third*—within a very small fraction—of *nitrate of lead* is an acid which is a *powerful* coagulator of albumen, yet its solution produces, with the albumenized surface of photographic paper, a *soluble* compound; but, with a solution of *sub-acetate of lead*, when the acid bears a little lower proportion to the base, we have an *insoluble* compound formed with normal albumen, although the acid, according to some authorities, is *not* a

* *Supposing* them to be soluble.

coagulator of albumen. Whether this anomaly be due to a chemical difference between dried and normal albumen, or whether it be due to the albuminates formed by different salts of the *same base* possessing *different properties*, I leave others to determine.

PHOTOGRAPHS IN PRINTING INK.

BY M. DE LAFOLLYE.

A sheet of paper is covered in the usual manner with a gelatinous or gummy solution and an alkaline bichromate, then exposed beneath a negative. The light turns the sensitive coating brown. If the picture obtained be now covered with printing ink, as recommended by Colonel James, and as M. Poitevin does upon the lithographic stone, this coating of ink extends all over it, and the picture cannot be brought out except by washing and rubbing, which, consequently, not only destroys the half-tones, but also the most important details, retaining only the masses. It was after following the prescription of my predecessors, and detecting the cause of failure, that I hit upon another way.

The picture being obtained upon the sensitized paper, the latter is placed upon a water-bath, image upwards. In the solarized impervious parts the moisture does not pass through, in the non-solarized and, consequently, soluble parts, the moisture rises to the surface by capillarity, and it manifests itself in the intermediate tones in proportion to the lightness of the tone. At the proper moment, the paper is removed from the bath.

Two methods of proceeding now present themselves.

1st. The first consists in placing the paper, picture downwards, upon the lithographic stone, and submitting it to pressure. The proof is then immediately removed, as after a transfer, and it leaves upon the stone a reserve of gum in the lights, while in the shades the impermeability of the surface prevents the gum from adhering to the stone. To ink it, the stone may be left to dry, and the ink afterwards applied with the roller, but it is better to proceed in the following manner. Upon a clean stone, spread a coating of transfer ink, by means of a roller. Upon this place a sheet of autographic paper, pass it through the press, and remove the sheet of paper which carries off a coating of ink on its surface. This inked sheet of paper is placed on the gum impression, passed through the press, and afterwards wetted so as to be easily removed. The autographic paper discharges its ink upon the stone wherever the latter is bare; but, on the other hand, does not attach itself to the parts protected by the gum, which are afterwards washed. The transfer is thus completely finished; it only remains to perform the necessary operations of lithography. The method, as may be seen, is very simple.

2nd. The second method is less direct, but more convenient. The proof, as in the preceding case, is placed on a bath of clean water, and removed when the moisture is visible upon the surface in a strong light. The moment at which it is removed is not a matter of indifference. Its exact determination is the only difficulty in this mode of operation. The proof, on its removal from the bath, is placed, image downwards, upon the stone blackened with ink, which served in the previous process, and then passed through the press. If the sheet were dry, it would receive the ink all over its surface, but the moisture introduced into it has, in some measure softened the still soluble gum, with which its surface is covered, and wherever this solution has taken place, reserves are formed which prevent the ink on the stone from reaching the proof. This is exactly the same principle as in the first method. In the one, with a sheet of inked paper we ink a stone, which retains reserves in gum; in the other, with a stone covered with ink we ink a sheet of paper retaining similar gum reserves. Immediately after pressure, we remove the sheet, which is preserved intact wherever the gum is moist, and which constitutes a proof more or less black with ink in all those parts rendered more or less impervious and insoluble by the action of light.

In the second method, the greater or lesser quantity of transfer ink, which constitutes the proof, does not result from a supposed affinity between the solarized bichromated green, and the fatty component of the ink; but simply from the more or less quantity of moisture introduced into the proof, which moisture rejects the ink in proportion to its intensity. The gummed and moistened proof plays exactly the same part as the stone which bears moist and gummed reserves. The ink adheres to one, as well as to the other; especially, whenever they are dry, and in proportion to their degree of dryness.

The proof being detached from the stone, it is freely washed in water, to remove the soluble bichromate; but without friction, even with a soft brush, under penalty of spoiling the proof; then leave it to dry.

The gelatine, or gum remaining on the proof, prevents the ink from spreading, and forms a sufficient sizing to ultimately effect the transfer from the stone. If, at the moment of detaching it from the blackened stone, the proof is perfectly dry, the washing may be dispensed with, and transferred immediately. The object of the washing is to remove the impurities which sometimes soil the lights of the picture.

Such, in brief, is the principle of the processes I propose for arriving at a more certain and more practical result than that obtained by known methods at the present day. What has always been sought in the various photographic methods is, to preserve and turn to account the solarized surface of the luminous imprint which contains the detail and half-tone, which are not found in the thickness of the sensitive film, if the surface is removed. Now, in the two methods proposed, it is just the solarized surface that is turned to account. It is that which determines the distribution of the ink. We also obtain details of extreme delicacy, either upon the solarized proof, or upon the transfer to stone. Moreover, the design once transferred, adheres directly to the stone, without the presence of any intermediate body. If, instead of transferring the proof to the stone, it is put upon a thick plate of metal, and the bare parts of the metal be acted upon with certain precautions, it is evident that the result will be either a typographic plate, or a line engraving, according as the exposure to light has been through a photographic positive or negative.

Lastly, if instead of inking the bichromated proof with transfer ink, we ink it with strong black or coloured ink, we obtain, after sponging away the bichromate and the gum, a very harmonious proof, and as permanent as a design in printing ink can be.

The proof accompanying the above description, forms part of a publication issued by the Archæological Society of Toulouse. It is printed from a lithographic stone, and forms one of 600 impressions, in none of which are there any signs of deterioration.

We have before us a large number of photographs thus transferred to the lithographic stone, and printed: they are truly remarkable, and M. de Lafollye's process appear to us to be well deserving attention.—*Les Mondes.*

CHLORIDE OF GOLD.

BY D. D. T. DAVIE.*

A few hints to photographers on chloride of gold, its importance as a toning agent, and how to test its purity, may interest the readers of your journal, or at least a portion of them.

Uniformity of strength, and great stability in chloride of gold used for toning photographs, is of the greatest importance to the consumer, especially to those who cannot discriminate by the appearance between chloride of gold and chloride of sodium. Liquid gold in a neutral state (liquid gold is always made neutral) is very unstable, and not un-

* From *Humphrey's Journal.*

frequently do we find it in a state of decomposition through the action of light or from other causes, to the extent that large quantities of metallic gold will be precipitated to the bottom of the bottle, and the inside will be coated with metallic gold. All who have tried the experiment have found it very difficult to retain gold in solution for any considerable length of time, if the solution was in a neutral state; hence the necessity of making a new toning bath every day for albumen prints; the solution being neutral, the gold falls to the bottom in a metallic state. There is still another objection, quite as important as the first, to liquid gold. It is this, that to one or two drachms of water, whichever is used, the manufacturer may add as much or as little gold as he likes, and still the quantity or bulk will be the same, and the difference in colour, with four or six grains of metallic gold to the quantity, will scarcely be perceptible, thereby giving the manufacturer an opportunity to realize a great profit if he chooses to do so. The latter objection likewise holds good against mixing salts of any kind with chloride of gold. Salt is not, under any circumstances, combined with chloride to improve the quality, but to increase the quantity. It is a nuisance and a swindle almost intolerable. It is true that by combining three parts of chloride of sodium with one part of chloride of gold, the consumer gets the total for fifty or sixty cents; notwithstanding it weighs 15 grains, it is only equal to one quarter of a 15-grain bottle of unadulterated chloride of gold, which is sold at one dollar per bottle. In the former you get a fraction of a grain less than 12 grains of salt, and a fraction of a grain over 3 grains of chloride of gold; or, in other words, you are paying at least two dollars for 15 grains of pure chloride. In addition to the extreme folly of paying four cents a grain for common table salt—which is at the rate of $5,256.00 per barrel—you are subject to such extreme variations in quality as to render toning an uncertainty, and subject you to losses of whole batches of cartes de visite.

The only way to overcome these evils is to entirely discard the use of chloride of gold mixed with sodium or salt of any kind. The crystallized chloride of gold unadulterated is free from all the foregoing objections. It may easily be known by its colour and crystalline beauty. If pure, it is a dark brown colour in masses of elongated crystals. By much shaking or long standing it loses its beauty of colour and crystals, but none of its virtue if the bottle has been well corked. Chemically pure chloride of gold is never yellow like indian meal, but brown, unless very old, and it has by age turned lighter, which is no objection except as regards its appearance.

In connection with this article on chloride of gold, I will give a simple, yet certain, test for salt in chloride of gold, and then close.

To find salts of any kind in chloride of gold:—Dissolve half a grain of the gold in one drachm of water; in another drachm of water dissolve one grain of nitrate of silver; drop from the silver solution one drop into the gold solution. If salt be present, the silver will be changed to a chloride, and the solution will look milky; if the gold is free from salt, the solution will remain unchanged.

[The singular fact here stated is very interesting if it be verified in practice. *A priori*, we should have expected that the chlorine being combined with the gold in a very loose state of affinity, would at once have left it for the silver, for which it has great affinity, forming chloride of silver, metallic gold, and free nitric acid; the toning processes at present in use really being based on a reaction similar to this. We may further remark that the writer overlooks the fact that double salts of gold are formed for the purpose of securing non-deliquescence and neutrality. It is a mixture of excess of chloride of sodium or other similar salt which constitutes adulteration.—Ed. Photo. News.]

ON THE PRINCIPLE OF IMITATION AS APPLIED TO THE DECORATIVE ARTS.

BY THOMAS PURDIE, ESQ.*

To make a great artist, the head, the heart, and the hands must combine. He must be possessed of the three great qualities which give power over the imagination, the emotions, and the understanding. He must be possessed, first, of imagination or fancy, the power which creates, invents, or suggests, which is common to the painter, the poet, and the sculptor. Second. He must possess a sympathetic nature—that power of sympathy which teaches the heart to vibrate in unison with the true, the beautiful, and the good. In simpler language, he must be possessed of taste, which has been well styled the science of the emotions, a faculty which—according as it is considered passive or active in its nature—signifies on the one hand susceptibility to the emotion, on the other, the knowledge intuitive or acquired, of those qualities in external things which are fitted to excite it in others. Third. He must possess technical knowledge and skill to enable him to express by means of form and colour the ideas which the mind has conceived. Now these three qualities of imagination or fancy, taste, and executive skill, must be found, less or more, in every work of art. Not equally.

It is only in the highest rank of art, where human life is the subject and human form the mode of expression, that the highest faculties of the artist are called into exercise. This rank is the highest, for the simple and obvious reason that it does so employ these powers that it deals with the noblest subjects, and addresses itself to the most profound emotions of the human mind. It is in the field which these faculties open to us that art must operate, if it is to assist in the great work of cultivating the intellectual powers or the moral sentiments, and in reaping the rich fruit they are calculated to bear.

But at the root of all art lies the love of imitation. To this feeling the fine arts owe their existence. Without some notice of it, therefore, it seems, no theory of the fine arts could be perfect. This love of imitation, or of representing objects by their images, whether exemplified in the tendency to imitate or in appreciating works of imitative art, is, no doubt, an original powerful sentiment or instinct of our minds. We love imitation for its own sake—not only as a means but as an end. Apart from and beyond the pleasure which we receive from such an object, for example, as a portrait, in recalling the features of the "distant or the dead, the loved or the lost," there is a pleasure in observing the resemblance between the original object and its image; a pleasure which may be traced to the same source, whether it be found in poetical imagery, in a dramatic representation, in a picture, a statue, or a simple imitation of marble.

But this love of imitation is not always associated with the highest qualities of the mind. It may be indulged in numerous instances where no original idea is expressed, or where that idea is to be found in the subject of the imitation. All such examples employ the mechanical more than the intellectual powers, and cannot therefore rank so high as works of art. They do not suggest great thoughts, but they may possess great beauty, and they may yield a rational pleasure in suggesting interesting relations between the imitation and the thing imitated.

Now, this imitation in the fine arts must be distinguished from reproduction, as well as from imitation effected either by organic or mechanical means. One receives no impression of beauty from the resemblance which the apples on a tree bear to each other. Nor would he be struck by seeing a table with a vase on it reproduced by another table and another vase. But let a painter produce these objects on his canvas, they would receive a new virtue, which, to use a popular phrase, would attract and please the eye. Where the deception is complete the pleasure is gone, because there is no image—nothing to judge of—nothing to compare.†

Having thus indicated what imitation in the fine arts means, we come, as proposed under our second head, to state some

* Continued from page 189.

† See "Essai sur l'Imitation dans les Beaux Arts:" By Quatremère de Quincy.

cases in which deceptive imitations are admissible as contrasted with others which belong to a different class.

But I must first explain that when, in the course of this discussion, I employ the terms deceptive or deception, they must be understood in a qualified, not an absolute sense. Where an object is an actual deception, it can obviously afford no pleasure as a work of art, although it may give pleasure from its intrinsic beauty. Suggestion, not deception, is the object even of that art which is purely imitative. Some objects, however, admit of, or demand, more perfect imitation than others.

We propose now to test, by a few illustrations, how far we are justified in making these imitations actually deceptive in their character, or so deceptive as to produce an illusion.

Such deceptions in that highest art which adopts human life for its subject, can scarcely be said to be possible, and so far as possible, would, if practised, meet with universal reprobation. The technical and merely imitative elements would be found to obtrude themselves offensively in works where they ought to be kept in a subordinate position. But there are other and more palpable reasons for our dislike. You cannot certainly imitate a living, breathing, sentient being so as to deceive permanently, but you may succeed in producing a momentary illusion. You may model a figure in wax to imitate, with tolerable exactness, the human form and features. You may colour the skin. You may cover the lay figure with clothes. The finely-moulded contour may charm for an instant, under the belief that you look at real flesh and blood. You approach—you touch—the spell is broken—"you start, for soul is wanting there." It is a corpse—a coloured piece of corruption. This, is no subject for a vulgar deceptive imitation truly. The nearer the approach made to the reality in such instances, the more offensive. Our dislike to such objects is founded on the same principle of our nature which makes us to consider the ape as the ugliest of animals, because it most resembles man. The wax figure is too like life, for it only awakens a painful sense of its absence.

The general condemnation awarded to coloured statuary, although partly due to habit and fashion, may be attributed to the feeling called forth by the test which we supply. A deceptive imitation should not be attempted where, from the nature of the thing, or the impurity of the material, it cannot be rendered perfect. I may mention, as examples of this principle, the coloured friezes in the Greek court of the Crystal Palace; the coloured carved Madonnas one meets in all Roman Catholic countries, with which few of our countrymen will be found to sympathise. I can hardly exclude from the catalogue the tinted statuary shown at Kensington in the late Exhibition. Of course no attempt was made with these statues to imitate nature, but what was done, if not a step in that direction, seemed to reduce the marble to the level of wax. No doubt there are other reasons for the feeling which we assume to exist, of which two may be stated. 1st. The colouring of statuary is an application to one art of the resources which properly belong to another; and 2nd. Sculpture has held the highest place in art because it appeals to intellect alone and not to the senses. The colouring of statuary, by introducing a sensual element, at once degrades it from his high position. We not merely tolerate, but admire statuettes in china coloured to the life with tolerable exactness. These, however, cannot produce an illusion, so there is no chance of their creating the feeling of disgust engendered by wax figures.

But this disgust and annoyance at the disappearance of an illusion are not always felt, even where the human figure is concerned.

Did any one ever feel disappointed at discovering the figures on the ceiling of the Parisian Bourse to be painting merely? Did any one ever experience other feelings than those of admiration at the inventive talent displayed in those designs, the marvellous imitative power and command of the materials of art which could produce such works. The means in this case are equal to the end. These pictures are, however, imitations, not of men, but of sculpture, and as such successful. Great as designs, and executed with such exquisite skill as to fulfil all the conditions required of the material which they are intended to represent.

Such works as these, the numerous painted *bassi rilievi* and other similar works in the Louvre and elsewhere, the paintings of De Witt and his followers, receive from the world generally, notwithstanding the denunciations under which they labour in common with all deceptive imitations, the meed of approbation which they so fully deserve.

How stands the case as to landscape? Framed pictures we may pass over as affording no illustration of our subject. It would be a very rare talent which would enable one to paint a landscape so as actually to produce an illusion when placed within a few yards of the spectator. But no illusions are more perfect than those of the scene painter. Are panoramic painted views, such as those of London, as seen from the top of St. Paul's, or of Paris, as seen from the Pantheon, to be forbidden delights in order to satisfy the requirements of this new theory, because possibly the spectator may have difficulty in persuading himself that he is looking on a flat surface? I have seen, as every one may have seen who has visited sunny Italy, what might have been a dismal court-yard changed into a paradise by the skill of the painter. In the foreground, instead of a blank, dreary wall, wood, and water, and green fields. In the distance a picturesque range of mountains, with the sunlight striking through the gorges and tipping the far-off summits with its golden radiance. But who, on working towards those mountains and finding they were merely painted on the boundary wall, not fifty yards distant, the wall itself being built so as to form their rugged silhouette, experienced other emotion than that of pleased surprise at the skill which could produce so marvellous an effect by means of painting? And are we to be told that all such art is base and inadmissible? "What! because thou art virtuous shall there be no more cakes and ale? and shall not ginger be hot in the mouth?" Must the pent up denizens of our cities be compelled to gaze on a blank dreary gable or into a dismal court, when he has a desire to look on brighter and more lively things, or to dwell among the horrors of Erebus, when the painter's brush, like the wand of a magician, may transform the scene into the Elysian fields?

(*To be continued.*)

Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting of this society was held on the evening of Thursday, April, 14th, in the City of London College, Mr. Sebastian Davis in the chair.

The minutes of a previous meeting were read and confirmed.

Mr. H. Cooper, jun., exhibited a number of fine specimens of double printing.

Mr. Martin exhibited a specimen of a tradesman's circular, with a number of hats photographed, illustrating the application of photography to advertising purposes.

Mr. Wall presented a copy of the *Art-Student*, No. 3.

Mr. Martin exhibited a specimen of iron printing, by a process recently described in the journals, and made a few observations on the method.

Mr. Wharton Simpson exhibited a number of Mr. Swan's carbon prints, a piece of the new tissue and a transferred negative by the process recommended by Mr. Swan. Also a photograph of Sir David Brewster, by Mr. Moffat of Edinburgh, taken in 60 seconds, by the aid of the electric light.

Mr. Wall exhibited a piece of albumenized paper printed under pure glass, tissue paper, and tracing linen, illustrating that the latter recently recommended for blinds, by Mr. Cole, and described in our pages, very freely allowed the transit of actinism, whilst it was quite sufficient to arrest direct sunshine. Mr. Parker had recently tried it for blinds in his studio, and gained considerable advantage in light, whilst direct sunshine was perfectly excluded.

Mr. F. W. Hart then proceeded to excite a plate and expose it, for the purpose of illustrating the action of the magnesium light, Mr. Simpson sitting for a negative. The time was about 60 seconds, and the amount of wire burnt about 24 grains, worth, at the present retail price of the wire, somewhere about 1s. 6d. During a portion of the sitting another piece of wire was lighted to soften the shadows on the dark side of the face. The exposure was sufficient, and the lighting not unsatisfactory; but, owing to the inconvenient circumstances, the negative was not quite satisfactory.

Mr. Hart remarked, that although he had selected a portrait to illustrate the action of the magnesium light, portraiture was probably the least important of the purposes to which the light would be applied, as sunlight was generally available, and was of course much to be preferred. It would clearly strike

photographers what a number of beautiful nooks and corners, interiors of churches, of caverns, &c., would be obtainable by this light, which had hitherto been beyond the reach of photography. He hoped, during the coming photographic season, its merits would be fully tested.

The Chairman proposed that at the next meeting they should discuss the experiences of members with the new carbon process, which Mr. Swan had generously placed at the service of amateurs without charge or restriction, reserving to himself only, and very properly, the right to some share of the profits made by those who used his process professionally.

Mr. Simpson announced that Mr. Fox, of Little Britain, had offered to mount any prints intended for the society's folio free of charge. He hoped that this offer would bring the society many contributions.

After some votes of thanks, the proceedings terminated.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, April 20th, 1864.

Mr. P. Liesegang remarks upon the substitution of the oxy-ethylate of silver for nitrate of silver, proposed by Don Francisco de Selgas; that he experimented upon this substance as long ago as 1860, without perceiving any advantage arising from its use. According to Dr. Schnauss' analysis, it is a mixture of nitrate of silver, acetate of lead, and nitrate of lead; therefore, the cheapness of the oxy-ethylate is problematical. As to its other properties, especially its rapidity of action, M. Davanne has already shown that nitrate of silver, mixed with sub-acetate of lead, constitutes a very sensitive bath.

It is, however, not without interest to know the formulæ M. Selgas employs with this product. The collodion must contain only 8-tenths of 1 per cent. of plain collodion (because the sensitizing bath contains but little silver). The developing is with gallic acid. The fact is well known, that gallic acid may serve for rapid development, if acetate of lead, or of lime, be mixed with it. The preparation of dry plates is, according to M. Selgas, very simple. The sensitized plate is washed and dried. To develop the picture, it is immersed in a bath of oxy-ethylate, of 5 per cent. strength, and developed with gallic acid.

At the last meeting of our Photographic Society, M. Carpentier presented a life-size bust of Daguerre, and gave a few words of explanation as to the conditions under which the work was executed. "He was," he said, "an intimate friend of Daguerre's, and he had very frequently endeavoured to get him to sit for his bust; but, much to the sculptor's regret, he always declined. Three months previous to his death, two photographers arrived from New York, and visited him at his little estate of Petit-Bry; and, presenting him the homage of the photographers of America, induced him to *pose* before their camera. It was after one of the proofs thus obtained, that M. Carpentier has, since the death of M. Daguerre, executed the bust now presented to the Society. The original is in the possession of Madame Daguerre."

M. Liébert exhibited some enlarged pictures obtained by means of the apparatus he presented to the notice of members at the February meeting. These proofs were exhibited with the view of replying to the objections made to his apparatus. They are taken on albumen chloride paper, enlarged from quarter-plate negatives, requiring fifty-five minutes' exposure; others, one-fourth the size, required only thirty-five minutes.

M. Morvan, in presenting some proofs for competition for the Duc de Luynes' prize, urged the necessity for all the specimens being taken from the same negatives, in order to establish a fair comparison; this suggestion would be difficult to carry out, but as, doubtless, the final decision will rest between a small number of competitors, this test might be applied to them with advantage.

Among the English competitors who have sent in specimens, I observe the names of Swan and Pouncy. The latter sends proofs in printing ink, and others in ceramaic colours, with the printed specification of his patent.

M. Poitevin sent the following letter:—

"Although entered as a competitor for the De Luynes' prize principally on account of my being the inventor of photolithography by the agency of the alkaline bichromates with gummy matters, &c., I now solicit the addition of the following claims:—

"1st. As the inventor of helioplasty, or engraving by moulding layers of bichromated gelatine, afterwards swelled up with water, in the parts unacted upon by the light, passed through screens, or negatives, or positives.

"2nd. For the moulding, with the same aim, of layers of gelatine, first rendered insoluble by perchloride of iron with tartaric acid, then rendered soluble in places where the light has passed through a negative, and, lastly, to ink these layers with fatty bodies, in order to obtain a transfer upon metal or stone of images which may be immediately printed from, or engraved by any of the known processes."

The Duc de Luynes Commission consists of the following members:—

MM. Regnault, Balard, Paul Perier, Mailand, Le Comte Olympe Aguado, Bayard, Edmond Becquerel, Cousin, Leon Foucault, Hulot, Le Comte Léon de Laborde, Peligot, and Robert.

M. de Lafollye sent a description of his process of obtaining photographs in printing ink, accompanied with a series of specimens, and announced himself as a competitor for the Duc de Luynes' prize.

Mr. Laulerie, the Secretary of our Photographic Society, stated that there is every probability of the forthcoming Paris Photographic Exhibition being equal to that of last year. Numerous foreign specimens had arrived, especially from England. Germany had sent fewer than was expected, which may be explained by the fact of an exhibition being announced to open at Vienna, and perhaps something is due to the present political excitement in Germany.

THE NEW CARBON PROCESS.

Sir,—In your last issue you have favoured the photographic public with the details of Mr. Swan's carbon process. It is pleasing to find that the paper read by him, and the specimens exhibited at the meeting of the London Photographic Society, met with a favourable and flattering reception.

Without in the least wishing to detract from him the merit which is due to him, for his successful efforts in enlisting in his favour the opinions of those who are able to decide, and to give a disinterested opinion as to the value of the processes under their consideration, with your permission, I wish to draw their attention to a letter in the Photographic News, for Sept. 4th, 1863, they will find in that letter that I had been engaged in the production of photographic pictures, positive and negative, on transparent films, with the view of exposing from the side opposite to the sensitive coating, and therein asserted I was able, by so doing, to get all the necessary half-tone belonging to a silver print. In that publication full directions are given for the production of the new tissue on which to produce the picture, and of transferring the same to paper, &c.

It is not for me to say in how far this publication will affect the claims to the processes about to be patented by Mr. Swan, it may be possible he never saw this letter; and, in the absence of other proof, Mr. Swan's friends may be of opinion that it will not affect the principle of his invention; however, the early publication of his processes will enable him to meet in his complete specification all objections which others may be inclined to make, and, therefore, will be of so much advantage to him. For myself, I would not

be inclined to discontinue the use of films of gelatine, collodion gelatine, collodion albumen, as they have been for a long time my favourites for the production of photo-carbon printing, photo-silver printing, photo-engraving, photo-lithography, as well as photo-diaphanie; at the same time, I would endeavour to have some respect for fair dealing, at least, more than has been given to myself in respect to the only processes (which were patented by me), by which a photo-lithographic transfer can be successfully produced.—I am, sir, your obedient servant, FRANCIS S. BEATTY.

PUFFING AT PHOTOGRAPHIC SOCIETIES, &c.

SIR,—I have noticed, for some time past, the gradual growth of an evil, against which photographers generally are concerned to protest. I refer to the practice of certain manufacturers and dealers making use of photographic societies and photographic journals, for indirectly advertising and puffing their wares, and thereby placing more modest and conscientious men at a disadvantage, and at the same time, very often misleading photographers, who are apt to regard the articles exhibited, as having received the sanction of the society.

The puff in question is effected in several ways: a paper is read to a society, giving an elaborate account of the advantages of a certain article, but carefully omitting any information as to the mode of preparing it; or, a gentleman attends a society to state and exhibit the wonders he has been able to effect with a certain lens; or a manufacturer sends to meeting after meeting a number of specimens, accompanied by a letter, stating that they were produced by his lens, or camera, or collodion, or on his paper, taking care in his letter to give his own wares the puff oblique, if not the puff direct; or, a member reads a paper full of information, it may be, but adding that he has been successful with the chemicals, &c., of some one dealer, and cannot guarantee equal success with any other. Such are a few of the modes of puffing to which societies are made subservient. In the journals, the scope for this kind of thing is more limited; but still it is practised. A manufacturer writes to describe his new invention, or to say that he can supply the exact want which some correspondent has expressed: or to explain that it was his No. 2 lens, not his No. 3, which produced the admired portrait of Snooks; or an anonymous correspondent writes to say, that he has got rid of all his troubles, by using the chemicals of A, or the apparatus of B.

It is not merely because it is degrading to societies and journals, that I protest against this system; but because it is manifestly unjust to other manufacturers, and misleading to photographers. If A states in an advertisement that his albumenized paper surpasses all other, I know how to receive the statement; but if he make a similar statement at a society meeting, I am apt to suppose, when I read the report, that he also brought forward some convincing proof, otherwise his statement would have been disputed. So of B's ever-improving collodion, or of C's automatic lens. If, for instance, it is stated of the latter, that it is more rapid, defines better, and includes a wider angle than any other, in a public meeting, it may naturally be assumed, that if the statement be not true, some of the members present would point out the error. But do they? Those who frequent meetings know, that, whilst many members will smile at the absurd statement, nobody takes the trouble to contradict it. If matters proceed as they have done in this direction, enterprising tradesmen will only need to employ respectable looking touters to attend meetings, and sing the praises of the goods they are paid to puff.

So also in the journals, editorial puffing is bad enough; but if I purchase an article on the strength of an editorial recommendation, and it proves worthless, I lose my faith afterwards in his, the editor's, wisdom or honesty: he bears the responsibility, and one soon learns to regard his opinion at its proper value. But if anonymous letter writers are permitted to give incidental puffs to the wares of their favourite dealers, or of those dealers who may give them a *quid pro quo* for the service, I have no remedy whatever if I am misled. You will pardon me, Sir, if I state that this kind of thing is a nuisance characterizing all the journals, your own only in a less degree than some of your contemporaries, and I think that photographers generally, and honest dealers as well, are interested in protesting against it. I am induced to write on the subject now, by seeing, in two of your contemporaries, complaints of an opposite character. In the *Photographic Notes*, a correspondent complains that you struck out of his letter the names of two manufacturers he recommended. Innocent soul! he feels it a wrong that he, an unnamed man, possibly the clerk or tout of the dealers in question, should not be permitted to puff them in your correspondents' column. But he has justice on his side when he complains that you allowed some other correspondent, whose name began with "S," to do that which you refused to him.

The second case is more amusing still. In the *British Journal* a whole page is filled with letters which it is stated you have declined to insert. The pretext raised is a love of abstract justice; but to me the whole affair appears as an elaborate puff. A very flagrant instance of the society puff has first been perpetrated. A gentleman, bearing a respectable name, comes to a meeting apparently with the express purpose of proving a certain lens superior to all others. A certain amount of the time of the meeting appears to have been devoted to the subject; a certain amount of space in two journals is devoted to reporting all this. But this is not enough. An admirer or tout of the manufacturer in question fancies or pretends to fancy he detects a bias in your report of the matter, and requests you to re-publish, side by side, your own and a contemporary report, and because you do not accede to this modest request, an amusingly solemn and condemnatory letter follows, and the whole matter is re-published with comments in the *British Journal*. I have compared the two reports, and with the exception of finding in each some remarks which do not appear in the other, yours being, on the whole, the fullest, I see no discrepancy whatever. From the editorial remarks which accompany the re-publication, your contemporary appears to hold the same opinion, and is rather apologetic for their own report, than condemnatory of yours. I repeat that the whole affair is an elaborate puff. The lenses may be good or bad, or, what is more probable, good and bad; but I protest against the puff at the society, in your report, in your contemporary's report, and now in this re-publication.

The exhibition of new inventions of any kind, or of interesting specimens of photography is of course always interesting, but I think it is the duty of the chairman of any meeting to discourage and put down every attempt at advertising or puffing particular productions, and not less the duty of editors to prohibit similar attempts in letters or articles, in short, not to permit the laudation of chemicals or apparatus in their pages, unless they are prepared to endorse and take the responsibility of such laudation.—Yours very truly, X.

April 18th, 1864.

[Our correspondent has opened an important, but difficult subject. One in connection with which it is easy to find fault, but difficult to do better. We fully agree with him as to the evil and impropriety of making meetings advertising media, but it would be very difficult for a chairman to draw the line between what is legitimate, and what abuse. Much must always be left to the good taste and good sense of individuals. Much interest is derived at meetings from the contributions of specimens, and although some manufacturers occasionally overstep the bounds of good taste, we don't think that on the whole much harm is done. On the subject of puffing in the journals, we can only state our own practice. When we record our own opinion of anything submitted to us for notice, that opinion is always limited to the exact experience we have had with the article in question, and always given honestly. If we had no principle, or self-respect to maintain even, honesty would in such case be pre-eminently the best policy, as a dishonest, or even an incompetent, opinion would soon be found out, and the influence and value of our journal would soon be gone. If at any time we permit correspondents to assume the critical function, it is done in their own name, and derives any value it may possess from that name. As a rule, we do not permit anything of the kind to appear anonymously; unless we can entirely endorse from experience the opinion expressed.

As regards the comparison of the two reports to which our correspondent refers, we are quite content to allow the matter to stand on its merits as stated in the pages of our contemporary, and allow any one who feels the slightest interest in the matter to form his own opinion from the facts as there stated. But since we refer to it at all, which, but for our correspondent's allusions we should not have done, we must state the facts: first, that the letters of X. M. D. have been tampered with; on comparison of the published letters with the MSS. in our possession

we find passages altered, passages omitted, and passages added. Second, that whilst we have no fault to find with the general comments of our contemporary, we must remark, regarding the question which the Editor, "speaking from memory," says the chairman did not put, and that for two reasons, it could not be put, we repeat most emphatically that the inquiry was made. We find, on reference to the shorthand notes made at the time, that referring to the wide angle embraced, the chairman, Mr. Dawson, said interrogatively, "I suppose it is obtained by putting the stop close to the lens?" As we remark, the words were used interrogatively, but if regarded as simply affirmative in character, the question is in no wise altered. We may mention, however, as explanatory of the error of our *confrère*, that he was not present at the meeting.—Ed.]

THE TWOPENNY PIRACIES.

Sir,—It has been said that every one has a grievance; and I think that photographers as a body have a very great one at present, which, if some means is not soon found, will do us more and deeper harm than any amount of cutting at low prices. For, by the way, I would remark that the rule holds good in all businesses—"A good article will always fetch a good price." It is the matter of piracies. Now I ask you, sir, in the name of common sense, is it fair and proper, that, after a man has gone to a great expense in the erection and improvement of his gallery—renting expensive premises, fitting up show and reception-rooms for the convenience of the public, and the engagement of first-class assistants at a high salary, as well as exercising a considerable amount of skill and experience in the production of an artistic picture—that some fellow in a back slum should reap the benefit of the other's ability, by offering to copy and give some 25 or 50 copies for a few pence, thereby depriving the originator of the picture of all future advantage. Now it is well known that, if it was not for the second orders, many establishments would soon be broken up.

Whether the copies are gems or trash is quite indifferent to the photographer. They are piracies. And any man of business knows full well that the public think little of the quality, but of the quantity they can get for their money; and numerous are the instances within my own knowledge of, not uneducated people, but gentry, who have sent their pictures to the *spoilers*.

The question, then, is this, is the pirate to be allowed to appropriate the result of the brains and skill of others? Is the public to be allowed to help in the gentle operation? Are we to stand idly by, and allow the enemy to enter and spoil us, without making an effort to prevent him? I say no. And the suggestion I make is this: that in the new Copyright Act a clause be inserted, that photographs be registered at a much lower sum, say 1d. or 2d. each; so that every negative that was taken could be made a copyright at once, and so prevent the pirate and public combining to defraud us—for such I consider it. It will be said, But people will not be troubled with signing paper, &c., and also that it will not pay to register every negative. The answer to both objections is very simple. In the former, have it understood that, unless the customer accede to the request, the negative will not be taken. In the latter, the photographer has only to choose between the loss of a few pence at once, or many pounds at a future time.

Trusting the idea may be of some value to those interested, I beg to say, in conclusion, that I am not actuated by any selfish motive, being only an assistant.—I am, sir, yours truly,

Taunton, April 13, 1864. F. J. S.

[If photographers can devise any means of relief from the evil of twopenny piracies, and get any clause inserted in the new Copyright Bill, which Mr. Black is about to introduce into Parliament, we shall be very glad. We fear, however, that it will be difficult to get the reduction in the amount of the fee for registration which our correspondent proposes.—Ed.]

CHEAPNESS, MERIT, AND DIPLOMAS.

Dear Sir,—The question of photographic cheapness seems to occupy the attention of your correspondents, and comments and suggestions being invited, I feel induced to make a few remarks on the subject.

Before prices can be adjusted to an universal scale, the profession must be brought to a dead level, photographers holding the highest position in the art must take a secondary position, and these very objectionable shilling men be raised to their level—the first would be difficult, the second impossible.

A correspondent in your last suggests the establishment of a photographic college. I think the idea excellent, but full of difficulties. It would certainly give tone to the men that had passed its ordeal, but it would not remedy cheapness unless empowered to prohibit any one from practising who had not received a diploma. An institution invested with such power would prevent many of the evils complained of, elevate the profession to a higher rank, and make it worth the attention of better educated and more intellectual men than the greater number of the mass now engaged in its practice, but with all the advantages of a photographic college to aid us in our difficulties the quacks (whom I regard as the most dangerous members of the profession) will still creep in.

The technical part of our science is simple, and easily understood; its successful practice, difficult. Few sciences afford greater scope for a man to make a parade of, and at the same time be more profoundly ignorant of, than photography; but our new institution, it is to be hoped, would require something more than a verbal examination, as such a course would make the passing a mere question of the skill of the grinder who prepared the candidate, and the retentiveness of his memory. Nothing less than a course of actual practice on subjects selected by the examiners in the different branches of the art (whether portraiture, composition, landscape, architecture, reproductions, or what not), would enable them to place their men in the right places. Of course, touched-up, finished, and coloured pictures would be entirely ignored, and the science recognized only in its purity; but thanks to the innovation of the card portraits, those abominations known as mezzotints of finished photographs are nearly extinct, and serve only to remind us of one of the dark epochs of photography that has happily passed away. But returning to the question of cheapness, the price of the photograph is not always a test of its relative value. Some of the worst photographers charge the highest prices, while, occasionally, skilful men charge very low. It appears to me to depend as much on the situation selected and the amount of impudence possessed as on any question of skill.

A few days ago, a country photographer called on me to get a 12 by 10 portrait taken of himself. He wanted a good specimen, "as he was going out of the cheap line, and going to try the exclusive dodge;" and I have no doubt that, with the assistance of paint, the local press, and unblushing effrontery, he will succeed.

The commercial character photography has assumed within the last few years, the increase in the numbers engaged in it, and the business getting into the hands of men who merely take it up as an investment, and feel no interest in it beyond the per centage it returns on the capital invested, are things not calculated to sustain its position or keep up its prices. But the same evils pervaded that golden age of photography—the Daguerreotype period, especially in its latter days. I met an old Daguerreotypist the other day, and he was railing at photography. He was disgusted with everything; he was, indeed, a second Jaeques. The pleasure of his life seemed to have passed away with the Daguerreotype. He looked back on it as the culminating point of the art, and dated the fall of photography from its decline. He seemed as a master mourning over an art he had lost for ever. My sympathies were aroused; I felt a keen interest in this man, and with a view to ministering consolation and diverting his gloomy thoughts to other subjects, suggested that there might be something left—a vignette, by Williams; a bit of sea and sky, by Wilson; a study, by Robinson or Silvy.

"Oh, yes," he exclaimed, with a deep sigh, "these are all very well in their way; but when we did the Daguerreotype we used to take from ten to twenty pounds a day, and all ready money, and did not go to the rooms till ten, and used to knock off at four. &c. &c."

I had an engagement, so could not stop to hear the rest; but, judge of my feelings, when sufficiently recovered from the first shock to reflect. It was not the beautiful process that gave him pleasure; it was not the lovely sequence of tints the plate assumed over the iodine and bromine that interested him; it was not the magical appearance of the picture over the mercury that delighted him; it was the money and the lazy life it enabled him to lead; these were its beauties in his eyes.

Apologising for intruding on your space so far, I am, sir, yours, truly, William H. Barton.

26, *Triangle, Clifton.*

Dear Sir,—Recently chatting with half a dozen fellow photographers, and talking on the topics of the day, the conversation turned on *cheap photography*. A great deal was said, and amongst the whole it was submitted that photographers ought to pass an examination, &c. I did not trouble you and your readers with a report of that conversation, knowing that your valuable paper has always many interesting subjects awaiting space. Since, however, in your last publication Mr. Beattie has opened that argument again, with the same suggestion, I trust you will permit me to add to it a few words. Indeed, an examination, especially of assistants, would prove of immense advantage. An errand boy is engaged for the delivery of parcels, &c., and after a few weeks he styles himself an assistant operator: a girl is engaged to trim and mount, and soon after she presents herself as an efficient printer and toner, &c. I have seen *operators* of such class pertinaciously calling themselves artistic photographers, not knowing actually their own department of the work, nor the difference between a good and bad negative when they see them. *This* is the principal evil of photography. Such operators, such printers, &c. &c., go to work for nominal wages, keeping thereby the honest and intelligent assistant out of work, until he is compelled to accept what he can get; therefore, cheap workmen enable the work to be sold cheap. But if thorough good assistants could avail themselves of an examination, and have a certificate of competency, they could command their terms, and, of course, would be reserved for first-class establishments, whilst cheap photographers could not afford to pay high wages, must be contented with young chaps, and send out work adequate to the price sold for. Hence photography would be divided into two distinct classes, like artist and painter, sculptor and stonemason, gold and gilt. As it is now, unfortunately, some of the cheap dens have indeed good assistants, because they can get them at a low price; and a father of a family cannot afford to be out of work until there is a vacancy in a respectable house (some of which, by-the-bye, look at 5s. per week more than their low neighbour).

Now, with regard to the realisation of the idea, it seems to me very simple. Whilst the project of a college or a club may come to maturation, let us avail ourselves of the existing photographic societies, and the principal photographic establishments, for such an examination. Surely if such as Mayall, Claudet, Williams, and others similar, were to grant an examination, and a certificate accordingly, there is the great desideratum obtained at once. And if I may be allowed the similitude, I can compare the present state of photography (with regard to assistants) to a bath out of order, through foreign organic matter. The remedy is simple enough: sun it and filter it—you would be astonished to see the bulky, dirty precipitate left in the filter. Keep your bath protected against such intrusions, and you will have pictures which will command good prices.—Yours respectfully, Assistant T.

Photographic Notes and Queries.

Transferring Negatives.

Sir,—I see that at the meeting of the London Photographic Society, on the 5th of this month, Mr. Swan, when replying to a remark of Dr. Diamond's, stated that a coat of gelatine poured over a collodion film, and subsequently varnished, could be easily removed from the glass. If this be so, then, indeed, has Mr. Swan succeeded in killing two noble photographic birds with one stone.

Having long laboured unsuccessfully to perfect the late Mr. Archer's clever, but uncertain, method of removing films by means of gutta-percha dissolved in benzole, &c., and fully aware of the great advantages that would accrue to the photographer by a safe and easy solution to the question, I am induced to ask Mr. Swan, through the medium of your columns, to be kind enough to detail the method he employs. Does he use the same solution of gelatine as he does for positive printing, *minus* the bichromate of potash and colouring pigment? How thick a film of gelatine does he "allow to set" on the negative before varnishing? If the gelatine is poured off as completely as in the case of ordinary collodion, I should have imagined that, even taking into consideration that the film would be composed of three coats, viz., collodion, gelatine, and varnish, it would still be far too slight and fragile for ordinary printing work. (I see in your leading article for April 8th, that you describe Mr. Swan's film as "similar in substance to ivory cards.") Again, how does Mr. S. proceed to remove the film from the glass? and is that process free from danger? I generally found, in working Archer's process, that my poorer negatives came off quite freely, but that whenever I had a negative which I particularly wished to preserve, it was sure to leave some important part adhering to the glass, or otherwise "come to grief."

Lastly, do they bear keeping? I had a large number of gutta-percha films stored between the pages of a book, but when I examined them at the end of a year or eighteen months, I found that although a few were apparently in the same state as when I placed them there, the great majority had split up into innumerable fragments.

I feel that an apology is due both to you and Mr. Swan for thus troubling you, but I think you will admit that the question is one of considerable importance, and that Mr. Swan would be adding to the debt of gratitude now due to him by photographers, and spare them many an hour of experiment and, perhaps, failure if he would kindly detail the method which has led to such good results in his hands.

Phosphorus.

Glen Barrabane, Castle Townsend, near Skibbereen.

[We fully endorse our correspondent's remarks as to the importance of the process, and shall be very glad indeed, if, in the midst of his onerous duties, Mr. Swan can find time for a few more detailed explanations, to which we shall have pleasure in giving publicity. In the mean time we can give some information in reply to our correspondent's queries. We believe Mr. Swan uses, for transferring, the same gelatine solution, minus the bichromate and pigments, used in his carbon process. With such a solution a coating applied, and poured off like collodion, will give a sufficiently thick film. An example of one of Mr. Swan's transferred negatives before, has a similar substance, or perhaps a little thinner, as his tissue, and is firm and elastic, without any tendency to curl or shrivel. As to durability, Mr. Swan informed us that he found it much superior to gutta-percha, in fact, he had no reason to doubt its perfect durability if protected with a good varnish. He also stated that there was no difficulty in removing the film; when all is perfectly set, he merely runs a penknife round the edge, and lifts the triple film away. The example before us is perfect in result, and suggests facility of operation, but we have not yet tried the operation ourselves.—Ed.]

Talk in the Studio.

Photography, Civilisation, and War.—George Augustus Sala, in his letters on "America in the midst of War," has some striking remarks on civilised warfare, arising out of comments upon one of the photographs taken on the field of battle. He says:—"Civilised nations carry on war in a civilised manner. Do they? Oh, lie of lies! oh, casuistry of casuistries! There is one of Mr. Gardner's photographs representing a dead soldier on the field of Antietam. A shell has caught him in the middle, ripped him up, and scattered his bowels about. There they are, most beautifully depicted. This is what your civilisation has come to. A free government, religious toleration, universal education, wise laws, national wealth, camera obscura, collodion, and a skilful photographic manipulator at forty dollars a week; and the result of all these wonderful engines of amelioration is a poor devil with a hole in his stomach and his entrails protruding. His entrails, madam. In the photograph I can see a locket, hung by a riband, round the dead boy's neck.

He is but a boy. The locket contains, perchance, the portrait of a mother, sister, sweetheart, or some rubbish of that kind. This is civilisation in warfare. I suppose that a shell is a more civilised implement of destruction than a dart, or a pike, or a tomahawk. Conical bullets are more humane, of course, than slugs; and a Swamp Angel is a mild and sugary article in comparison with a battering-ram. Still we go on prating about civilisation in war, while the same hideous gashes are made, while the same maggots fester in the same wounds, while it is the same death that overtakes him who is slain by a Malay creese and him who falls by a Colt's revolver. And yet I have heard Christian clergymen spouting vehement platitudes about the God of battles."

Photozincography.—Col. Sir Henry James has just completed the whole of the photozincographic *fac-simile* of Domesday Book, consisting of 32 volumes, having printed in all 10,080 volumes. Some examples of his further progress in obtaining half-tone in impressions produced by his process will be exhibited at the next Photographic Exhibition.

Photograph of Garibaldi.—Notwithstanding the great objection of Garibaldi to be photographed, he consented in a few instances. We have been favoured with one of the portraits secured of him at the Royal Arsenal, Woolwich, as a memorial of his visit to our national factory of war stores. Mr. Spiller informs us of the complete success of a single sitting, in which both largo and small portraits were secured simultaneously. He says:—"We had already placed in the new glass room three cameras (two of which were binocular), all being so directed as to enable us to take the five portraits simultaneously. Upon Mr. Abel's invitation the General kindly seated himself in the appointed place, and I was fortunate enough to secure an admirable likeness (whole plate size) of our distinguished visitor, whilst my military assistants were equally successful with the other cameras. The interval of exposure was ten seconds only, at five o'clock on that day, with Dallmeyer's quick-acting portrait lens; and with the No. 1 B lenses of the same maker, in the binocular camera, even a shorter time." The copy before us is an admirable portrait of the noble head and face, which in its calm, placid dignity is almost solemn, but at the same time strangely winning and sweet, notwithstanding its weather beaten and bronzed aspect.

To Correspondents.

J. F. T.—Mr. Swan's process is equally applicable to landscapes and portraits, and, in fact, to all kinds of subjects. Amongst the specimens in our possession are some exceedingly charming instantaneous marine views, with sea, clouds, and shipping, by Wilson, as well as portraits. Mr. Swan is not, we believe, in a position to make any specific arrangements as to licences until the completion of his patent. We believe that the tissue cannot, at least at present, be sold ready prepared.

D. Grant.—So long as your bath continues to yield good prints, you need not necessarily strengthen it. With the nitrate of soda present, you cannot ascertain the proportion of silver present with the ordinary argentometer. You will have to precipitate a portion of it with a standard solution of chloride of sodium, the quantity of that salt necessary to precipitate the whole of the silver in a given quantity of the bath determining the strength. Mr. Hart's volumetric apparatus is a very neat contrivance for the purpose, and everything necessary for the operation is supplied with it.

Blind.—It is clear that you have too little light in your room, although at first sight the quantity of glass you describe ought to admit sufficient light. On carefully examining the photograph of your studio, however, we think the cause is tolerably apparent. You have your glass cut up by too many sash bars, the panes are too small. We think it is probable that if you stand where the sitter is usually placed, and look towards each window, you will see little but the sash bars, instead of a sky. The picture enclosed appears to be illuminated with a light nearly equally strong on both sides; this is either caused by two side lights, or by a strong white reflector very near to the face, and would be fatal to expression in the eye, which should receive but one principal light and one minor or reflected light. 2. Much depends on circumstances as to what kind of blinds are best: either white or blue calico may be used with advantage. 3. The mode of fixing is purely a question of mechanical convenience very often determined by the facilities the room presents. 4. We should place the sitter so as to face the north. The iridescent effect of which you speak on the glass may possibly be due to some surface film which may obstruct a little light, but the chief loss is most probably due to the cause we have already indicated.

H. A. S.—You do not state the method employed in the preparation of your chloride of gold, that is, whether you used any alkali to neutralize the excess of acid, and then made it into a solution of a specific strength, or whether the acids were evaporated, and the chloride of gold crystallized. We have used many commercial samples of chloride of gold, and also samples we have prepared ourselves, with the acetate formula, without any precipitation. Is your acetate quite neutral alkaline? Do you keep the toning solution in the dark? Is the bottle perfectly clean, and the water free from contamination? Heat and light favour precipitation. 2. Hyposulphite of soda may be kept in solution without injury, if unused. 3. We do not quite understand the nature of the minute cracks of which you speak. We could give an opinion better after seeing an example of the defect. We are glad to learn that you are so successful with nitrate of soda. 4. The cause halation to which you refer is not perfectly understood. It is most common where there is a little under-exposure, and where sudden contrasts exist in the subject, and is more common in some states of the bath than others. We suppose it to be caused by the free nitrate belonging to that portion of the plate where a deep black occurs, not being reduced at that spot, light not having acted there, is thrown down in excessive proportion at the portion immediately adjoining where light has acted. The only suggestion we can give for avoiding it is to give sufficient exposure.

J. C. L.—Avoid having your principal light facing south, or you will have much trouble. If you could guarantee continual sunshine you could secure a good light, and yet have permanent arrangements for avoiding direct rays on your sitter, but in this country, where the shining of the sun is so variable, you would be kept continually altering your arrangements. The arrangement which might work well in the United States would be very troublesome here. Take care to have sufficient pitch to throw off the water, which will otherwise be a source of great inconvenience. You need not hesitate to ask us any number of questions when you require advice or information; but your questions are scarcely sufficiently clearly detailed to enable us to go into detail in advice. You will find much information on the subject of glass-houses in our Year-Book.

J. M. M.—Joubert's patent process of producing photographic enamels consists in using a mixture of albumen, honey, and a bichromate, exposing under a positive, applying vitreous colour in powder, and then burning in. We are uncertain as to whether he grants licences, and on what terms. You will find an article on producing photographic enamels in our next.

Both Sides.—It is not worth while to pursue the matter further. We cannot spare space for such discussions, and *le jeu ne vaut pas la chandelle*. The several writers to whom you refer contradict and neutralize each other. It is by no means certain however, as you assume, because the writer of "The Other Side" quotes "Hammersley," that he has read him; some people have a knack of quoting an author at second-hand, without ever reading his work in its entirety. In that point, therefore, "Spectator" may be right. We are as much amused as you at the other correspondent, the *soi-disant* "Lover of Truth," assuming that "Both Sides" and the editor are one flesh. However unsuitable his cognomen may be generally, it is clear that, like "Marall," he tells truth once a year, in admitting that he is "no conjuror." In the supposition in question, as well as in his general remarks, he certainly proves himself very far indeed from being either conjuror or logician. The idea of discussion or refutation is inappropriate, as, where no argument is used, there is nothing to discuss or refute.

T. H.—It is better to use a glass or porcelain funnel for silver solutions, as you then can readily clean it, and also see when it is clean. If, however, you have never used the gutta-percha funnel for any purpose but silver solution, it is not likely to do any harm. The use of a solution of ammonia nitrate of silver is thought to give richer and deeper tones, and greater sensitiveness.

Dr. Wright.—The letter was forwarded.

A. P.—It entirely depends upon the nature of the process as to whether it can be patented, or whether it is desirable to do so. For such a process it is very probable that a patent would be available, and unquestionably an inventor has a right to seek for some method of reimbursement. 2. The second is much more doubtful as a subject for patent, as it has already been done. Whether yours is a fresh method or not, of course, we cannot say The former has not been done so as to be available for any practical purpose.

April.—Mr. Swan uses 6 grains of india-rubber and 20 grains of dammar in one ounce of benzole. The paper is floated on this, and the tissue is floated on it; both are suffered to dry, and when the coated surfaces are pressed into contact they readily adhere.

H. Pippett.—If by adding carbonate of soda to your bath you caused a precipitate, you would weaken your bath just to that extent; but if you only added sufficient to neutralize free acid, it would do no harm.

Excelsior.—A very common cause of streaks is the use of a nitrate bath too strong. Try what diluting the bath a little does. There are not many publishers of photographic prints: the chief that we remember are Marion and Co., and the Stereoscopic Company.

N.—Your interesting letter in our next.

Articles of "Photographic Enamels," "Relief Fund," "Photographic Diplomas," &c.: "Manipulation," "Photography in Berlin," &c. &c., with several letters, are compelled to stand over until our next.

Several correspondents in our next.

Photographs Registered during the Past Week.

Mr. John Francis Ward, 56, Ely Street, Stratford-on-Avon,
Photograph—View of the Building erected for the Shakspeare Tercentenary Festival at Stratford-on-Avon.

Messrs. W. and D. Downey, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of Henry Vincent, Esq.
Photograph of Rev. W. M. Punshon, M.A.

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth,
Photograph of Captain Dodd.

Messrs. S. and D. Smith, 13, Victoria Street, Rothsay,
Photograph (Group) Richard Mackirdy, Esq., Messrs. Mackinlay, Doig, and Sharp.

Mr. Vernon Heath, 43, Piccadilly.
Two Photographs of their Royal Highnesses the Prince and Princess of Wales and the Infant Prince, taken at Sandringham on the 14th of April.

Mr. John Stuart, 120, Buchanan Street Glasgow,
Two Photographs of Rev. Walter Ross Taylor.

Mr. Thomas Mercer, 32, Queen Street, Great Harwood, Lancashire,
Photograph — Interior View of Our Lady and St. Hubert's Catholic Church, Great Harwood.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 295.—*April* 29, 1864.

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PHOTOGRAPHIC ENAMEL.

THE production of pictures possessing all the delicacy and truth of the photograph, with the permanency and other good qualities of enamels, is a question which has long occupied the attention of experimentalists. Many processes, more or less successful, have been devised: but up to the present no entirely satisfactory process has been published. The method of M. Joubert, patented two or three years ago, and described in our pages, gave for large subjects very fine results indeed, but so far as we know it has never to any extent been applied to portraiture, and would for such work lack some of the delicacy desirable. The pictures exhibited by M. Lafon de Camarsac in the French department of the last International Exhibition, were, however, everything which could possibly be desired, in colour and gradation, delicacy and force they surpassed the finest photographs on paper. The mode of producing them is, however, a secret, and the process is therefore of very limited service to the public. A process for producing satisfactory photographs on glass and ceramic wares is therefore still wanted, and the Society of Arts offer no less than four medals, in their last list of subjects for competition, for pictures resulting from such a process.* We think it is probable that Mr. Swan's process will possess all the elements of perfect success; but before inquiring into the mode of applying it, we will glance for a moment at the history of the method employed by M. de Camarsac.

At the recent meeting of the Photographic Society, Mr. Tunny expressed his conviction that the process described solved the question of photographic enamelling, and remarked that the moment he saw Mr. Swan's pictures he was struck with their great similarity in appearance to the enamels of M. Camarsac. The same thought had occurred to ourselves, they had struck us as possessing all the delicacy, force, purity, and transparency of the enamels in question. Mr. Shadbolt said that if the processes were the same as Mr. Tunny had intimated, he feared that Mr. Swan's patent was at an end, for M. Camarsac had, unless he was much mistaken, published his process four or five years ago. Mr. Tunny replied that he was with M. Camarsac three days previously, and that gentleman then remarked that not a soul but himself knew his process. We then rose, and suggested that both gentlemen were right —M. Camarsac had published an article on his process four or five years ago; from which, however, no idea whatever as to the method of proceeding could be derived. On referring to the article in question, which appeared in *Cosmos*, July, 1859, the chief information we find is, that the image is formed of metallic oxides, such as those of copper, iron, manganese, cobalt, gold, silver, &c., burnt in by the usual process of enamelling. How the image is formed in these vitrifiable colours is not even suggested. On reference, however, to an earlier article by M. Camarsac, which appeared in the *Comptes Rendus*, in June, 1855, on the subject, we obtain sufficient information to confirm the idea of Mr. Tunny, as to the probable similarity of the processes used by Mr. Swan and M. Camarsac. The article to which we now refer gives very little definite information, and suggests that at the time M. Camarsac was engaged in experimenting with several processes. One of these is there stated to be dependent on the action of light on gelatine and salts of chromium. It is only of late years, however, that M. Camarsac has obtained the perfect results which photographers have so much admired, and we think it not improbable that a process, similar to that of Mr. Swan, or M. Fargier, has probably been used in the improved results.

The mode of applying Mr. Swan's process will readily suggest itself to those who know anything of the process of enamelling. For the benefit of those less familiar with the usual methods, we may briefly indicate the general character of the operations. The substance upon which the enamel is placed, may be either glass, porcelain, or other ceramic material, depending upon the purpose of the picture. Portraits are, however, placed upon enamel tablets, prepared for the purpose. These generally consist of thin sheets of copper, covered with a thin stratum of white enamel paste, consisting of powdered glass, powdered flint, calcined borax, and red lead, mixed in different proportions, according to the heat at which it is required to fuse. This tablet is generally slightly convex, giving a superior effect of relief to the picture. There are other methods of preparing the ground, and also of modifying its tint; but this part of the process may be avoided by purchasing the tables ready for use.

Now, taking up Mr. Swan's process, the details of preparation and manipulation will be nearly the same; but, instead of using indian ink, a pigment will be added to the gelatine, which is of a vitrifiable nature, and when fused will give the colour required. Here two important considerations occur, which will require a careful practical consideration, in order to secure success. It will be necessary not only to determine the metallic salt, which will, when burnt-in, give the right colour, but to find one which at the same time is sufficiently light, and in a sufficiently fine state of subdivision, that it may be held in a perfect state of suspension analagous to solution in this chromo-gelatine solution. When this is determined, it will, to some extent, determine the preparation of the ground of enamel, so that the temperature at which the colouring matter and the ground are fusible bear a proper relation the one to the other. For the selection of the colours it is clear that some knowledge and experience will be necessary. For blacks, protoxide of iron or the peroxide of manganese, with a trace of oxide of cobalt, is commonly used in ordinary enamelling processes. For brown, the same salts, with antimony instead of cobalt. For purple, oxide of gold

* See PHOTOGRAPHIC NEWS, Vol. vii. p. 565.

with peroxide of manganese. For blue, oxide of cobalt alone. For red, the protoxide of copper. For varieties of tint, other metallic salts may be used, or mixtures of these in the proportions indicated by experience.

The processes of printing, removing the unaltered gelatine, &c., will be the same as with the ordinary carbon process; but when this is completed the film must be transferred to the enamel tablet, which will then be placed in the muffle, and treated in the manner with other enamels. The heat will deflagrate and destroy entirely the organic matter, holding the colouring matter, which will become fused and combine with the ground on which it is placed.

There are other details connected with the enamelling process, such as the occasional use of a flux of powdered fusible glass over the image, so as to give a vitreous coating or glaze to the whole, &c., into which it is no part of our province now to enter, our aim being simply to indicate how, by this process, perfect photographs with every gradation of half-tone may very easily be produced with the unalterable durability and delicate beauty of enamels. It will be clear, also, how easily these may be coloured in vitreous colours, and the photograph become the basis of beautifully coloured enamel miniatures.

PHOTOGRAPHY IN BERLIN.

Gustav Schauer's Art Reproductions.

BY J. W. OSBORNE.

Amongst the numerous photographic establishments of Berlin, there is not one which possesses so much general interest for the readers of the News as the above institution, a short sketch of which I propose giving you on the present occasion.

The interest which attaches to Mr. Schauer's reproductions is not due to any extraordinary novelty in the character of the pictures, nor yet in the processes employed, but rather to the magnitude and importance of the undertaking as a whole, to the success it has met with for many years, and the excellent management and order which govern all the operations. The business is devoted solely to the reproduction of works of art, and their publication in uniform and cheap editions. Thus Raphael has supplied the material for no less than five different albums, and collections have been separately made of the works of Correggio, Murillo, Michael Angelo, Titian, and other great masters of the Italian and Spanish schools. The Flemish painters are represented by the brothers Van Eyck, on the one hand, and by Rembrandt, Vandyck, and Rubens on the other, while German art is given to the world in the works of Albrecht Dürer and Holbein. The creations of each of these and many other painters are published separately in the form of albums, bearing the artist's name, and comprising from 10 to 20 photographs, while each is accompanied by a treatise descriptive of the school or master, as the case may be, from the pens of writers of high standing in the literary world of art. Amongst these may be enumerated Waagen, Hatho, Adolf Stahr, Lübke, Eggers, Titus Ulrick, H. V. Blomberg, &c., whose writings have been translated into English and French, so that the circulation of these albums is not restricted to Germany alone.

Respecting the mighty influence which the general dissemination of well-written works of this kind, illustrated with the truthfulness of photography, must exercise upon the art-education of mankind, there cannot be two opinions, and it is this successful and comprehensive application of photography as an instructor and educator of the most elevated kind, which demands our respect, and appears to me to invest this subject with peculiar interest.

Nevertheless, I did not propose to myself to enter at any length upon this topic, from an æsthetic point of view, but rather to furnish you with a plain matter-of-fact account of the technical activity of this establishment, which, in extent and importance, I believe to be unequalled in any other country. For this purpose, I visited Mr. Schauer, who very kindly showed me his atelier, and work rooms, and pointed out whatever he thought most worthy of notice in his arrangements.

The glass room is at the top of the house, it is lighted from the north, so that the pictures are always copied in diffused light. The developing room is lighted with gas, protected by yellow glass, a method much followed here, but one which I regard as unsatisfactory and even dangerous. Respecting the negative process there is nothing to be said, it is that ordinarily employed; but it is worthy of remark that many of the most valuable engravings copied in this institution are lent with the authority of Government, by the custodians of the valuable collection of engravings and etchings in the Berlin Museum, and in such cases they are placed under glass, through which the negative has to be taken. Even under these circumstances good results are obtained, but the reflections from the glass, and loss of light, increase the difficulty very much. For many reasons it is often more satisfactory to represent the works of an artist by photographic copies of good and celebrated engravings and lithographs, than by reproducing the paintings themselves. The latter are not unfrequently difficult of access, and still more frequently the works of the old masters exist in colours originally dark and unfavourable for photography, or they have become so by age. In acquiring copyrights, and in the purchase of rare and valuable prints, Mr. Schauer has spared no expense, and his collection of the latter is a most interesting and instructive one.

The arrangements adopted for printing positives were new to me; but under the circumstances (want of room), I believe they could not be better. In moderately fine weather, with the ordinary amount of business, 600 pressure frames are exposed together three times in the day. These, with the subsequent toning and fixing of the resulting prints, are attended to by 12 men. Each frame is large enough for the largest negative in ordinary use, and therefore takes three or more negatives on the same plate of the carte de visite size, from four to six thousand of which can be produced daily. The exposure is made within a number of rooms built upon the roof of the house, forming three sides of a quadrangle. The sides of these rooms consist of glass, and are provided also with white blinds, which can be raised or lowered at pleasure. Close to the glass a number of racks are secured, which support the pressure frames in tiers one above another obliquely towards the sky, and inside the racks are sliding sashes with painted glass, the use of which is to darken the room sufficiently to admit of the examination of the prints from time to time. The exposure always takes place in diffused light or shade, so that when the sun shines upon one of these rooms, the blinds upon that side are pulled down. The object of these arrangements is to render the printing process as regular and systematic as possible, so that it may not cause the workmen to be overwhelmed with more work than they can manage on a bright day, and leave them nearly idle on a dull one; to render it mechanical, and not make too serious a demand upon the constant intelligence of the men; and to keep the whole of these operations as independent of the weather as possible. The average quantity of paper sensitized daily is 200 sheets in summer, and from 120 to 150 in winter. It is floated on a very strong bath containing about 90 grains of nitrate of silver to the ounce. The toning is alkaline, and the solution is used warm, as Hardwich recommends, by placing the dishes upon tiles heated by gas. Great care is taken in fixing to have the solution of hyposulphite always fresh, it is changed regularly after a certain number of prints have been fixed, so as to guard against sulphurization.

Perhaps the most novel operation employed in this establishment is the method adopted for washing the prints. Over a water-trough from which there is an escape pipe, two marble rollers are fixed, one above the other. These rollers are about 8 inches in diameter, and 20 inches long. They are capable of being set in motion by a winch, and a perforated

pipe sends a fine shower of water over them from above, which falls into the trough below, and flows off by the escape pipe already mentioned. The trough is divided into two compartments, one before and one behind the rollers. The prints, which have been fixed and rinsed in a few changes of water, are deposited in one of these compartments, where they swim about in the water. The water from above is now turned on, the rollers are then set in motion, and a workman places one print after another upon the lower roller. As each print passes through the rollers it receives the pressure caused by the weight only of the upper one, but this is sufficient to impart a peculiar transparency to the paper. It adheres to the upper roller, and is taken from that by a second workman, who deposits it in the other compartment of the trough. This process is repeated a second time with all the prints resulting from one day's work, and they are then allowed to remain until the following morning in four large troughs full of fresh water, when they are passed a third time through the rollers, and hung up to dry on racks. The principle on which this method of washing is based is very obvious. The pressure to which the prints are subjected forces from the pores of the paper the solution of injurious salts, which are, no doubt, the chief cause of fading; and this takes place in a superabundance of pure running water, which, as the fibres gradually expand again, takes the place of the solution just expressed and washed away. This process is repeated a second and a third time, and the prints are then regarded as perfectly washed.

When the surface of these rollers becomes at all uneven, they are removed, and turned off again in the lathe, a second pair taking their place the while, so as to prevent delay or interruption of business. Mr. Schauer has paid much attention to this operation; he has tried rollers made of various materials, such as metal, porcelain, wood, papier mâché, and glass, with all of which substances he has some fault to find. He has also tried a covering of vulcanized india-rubber, which he states cannot be used at all, as it tears the prints. Marble of good quality works well, and the surface can be easily removed at any time. In addition to the selection of a good albumenized paper, and the ordinary precautions in toning, fixing, and the ventilation of the work-rooms, Mr. Schauer is of opinion that the question of permanency is only one of perfect washing. It should not be forgotten that the problem is not how a few dozen prints may be washed, but how to wash thousands daily in the cheapest and most expeditious manner, so that one may be certain that they all have been treated alike, and all sufficiently; and, lastly, the method must be easy of execution by ordinary workmen. Mr. Schauer believes that he has solved this problem by the plan I have described, and ascribes the permanency of his productions to it as a natural consequence. As far as my own judgment and experience go, I am inclined to agree with him. I am certainly of opinion that it is the most perfect system of washing I have seen, or have any knowledge of, and shall be glad to hear of its successful adoption in England.

By determining on certain sizes and reducing all originals to one of these, much trouble and waste is saved in trimming and mounting prints. The trimming is effected in a small embossing screw press, worked with a lever and ball. Each press is furnished with a number of cutters consisting of steel rings sharpened to a knife edge, and having the desired quadrangular or oval form.

By stamping out the prints in this way, perfect uniformity is ensured and much time is saved. The mounting is effected by bookbinders, gelatine being employed for that purpose.

In the commencement of this sketch I have enumerated some of the works which have issued from Mr. Schauer's establishment, works which bring the world of art within the reach of all, and thereby educate and ennoble the public taste and appreciation of beauty. With most praiseworthy enterprise Mr. Schauer is at present providing for our future enjoyment. Hotho is engaged for him in writing a "History of Painting," to be illustrated with selections made from upwards of 300 pictures, and Hermann Weiss will be the author of a series of "Biographies of the Painters." Both these works will appear contemporaneously, in parts, and the text will be rendered in six languages.

Let us wish these undertakings a success commensurate with their great usefulness, with the clear practical judgment to which they owe their conception, and the energy indispensable for their management and final execution.

Berlin, 30th March, 1864.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Analysis, and Adulteration.

Lead (*continued.*)—Acetate of lead, or sugar of lead, is one of the commonest salts of this metal. It is prepared on an enormous scale by heating together metallic lead, or its oxide, with crude wood vinegar; and the liquid, which will generally be highly alkaline, by reason of its containing an excess of oxide of lead, dissolved in the acetate, is rendered slightly acid by the addition of acetic acid, and evaporated to the crystallizing point. Crude sugar of lead separates, and in this form it is generally sent into the market. If a pure salt is required, the commercial crystals, which have carbonate of lead, and also a brown substance adhering to them, are to be dissolved in hot water, containing a small quantity of pure acetic acid; and the liquid, after filtration, evaporated to the crystallising point. Acetate of lead, when in the form in which it ordinarily occurs, contains three equivalents of water of crystallization. The crystals are transparent and colourless prisms; they have an astringent, sweet taste, and dissolve in an equal weight of cold water, and in half their weight of boiling water. When the aqueous solution is boiled, acetic acid goes off in small quantity; acetate of lead also dissolves in alcohol. The compound which we have described above, is the neutral acetate of lead containing equal equivalents of metal and acid; but acetate of lead is remarkable for forming a series of basic salts, in which several equivalents of the oxide of lead are present, to one of acetic acid; thus we have a sex-basic acetate of lead, which may be regarded as a compound of one part acetate of lead, with five parts of oxide of lead; a ter-basic in which two extra atoms of oxide of lead are united with the normal acetate; a bi-basic, containing equal equivalents of acetate and oxide of lead; and a sesqui-basic acetate, in which one part of oxide is united with two parts of acetate. All these compounds may be viewed as simple mixtures; they are mostly soluble in water, and have an alkaline reaction, which is stronger as the oxide of lead is in greater excess,

The alloys of lead are of some considerable importance. With antimony and bismuth it forms type metal, and with tin it forms solder. Fine solder is composed of three parts, by weight, of tin to one of lead; common solder, of equal weights of the two metals; and coarse solder of one part tin to two parts lead. Fusible metal is composed of a triple alloy of lead, bismuth, and tin. *Rose's* alloy is composed of two parts bismuth, one part lead, and one part tin. It melts at about 200° Fah. *Newton's* alloy is formed of eight parts bismuth, five parts lead, and three of tin; and *Lichtenberg's* alloy consists of five parts bismuth, two of lead, and three of tin. These all melt below the boiling point of water. A quadruple alloy of lead, cadmium, tin, and bismuth, has been proposed by Dr. Woods. He finds that the addition of a little cadmium increases the fusibility of alloys to a remarkable extent. An alloy of one to two parts cadmium, four parts lead, seven to eight parts bismuth, and two parts tin, fuses at about 150° Fah., more than 40 deg. below Rose's or Newton's alloy, and is, in consequence, specially adapted for light castings heretofore only made with alloys in which mercury is an ingredient. Dr. Woods has also proposed a new solder in which cadmium plays a prominent part. A mixture of two parts of cadmium, four

parts of tin, and two parts of lead melted together, possesses, at the same time, great fusibility and the requisite tenacity and malleability. It melts at about 59 degrees below the fusing point of ordinary solder (lead and tin). It is superior to the latter, especially when used for soldering the alloys, such as tinware, containing much tin, which are used in the arts, and generally in all cases where an easily fusible, tenacious, and malleable solder is required. With regard to these qualities, this alloy is in no respect inferior to the ordinary solders; while, on the other hand, it is much superior in these respects to the so-called bismuth solders which melt at just as low a temperature. This solder has been found of very superior quality, and very serviceable for casting and moulding. Instead of directly preparing a special alloy, the proportion of cadmium above indicated may be added to the ordinary tin solder. A higher degree of fusibility is thus obtained than when bismuth, which was formerly added for the same purpose before it was so scarce, is employed, and, unlike bismuth, cadmium does not lessen the tenacity and malleability of the alloy.

Lead and silver fuse together in any proportion, in fact most of the silver of commerce is extracted from lead, which in the state in which it is obtained from the ore, contains an appreciable amount of the precious metal. The method of separating these two metals is based upon some very beautiful physical laws, and forms, a striking illustration of the importance in metallurgical operations of apparently the most trivial facts. When ordinary lead is melted and allowed to cool, slowly with constant stirring, it begins to solidify in the form of small crystals, and it was discovered by Mr. Pattinson, that the crystals which first separated, consisted of almost pure lead, whilst the liquid portion of metal, which was the last to solidify, contained the whole of the silver. By taking advantage of this fact, the process was devised for de-silvering the lead, which is now adopted in all lead-smelting works. The metal is melted, and whilst it is cooling the crystals are stirred about, and raked out with a perforated iron ladle holding about half a hundred weight; in this manner the metal is divided into two parts, one containing considerably more silver than the other; and by repeating this operation several times, the whole of the silver may at last be concentrated into a comparatively small quantity of lead. This very rich alloy is now submitted to the process of cupellation. A large flat tray, somewhat the shape of a meat-dish, is made of bone ash, and placed on the hearth of a reverberatory furnace, where an oxidising flame can play upon it. The argentiferous alloy is then placed in this *cupel* as it is called, and being rapidly melted by the oxidizing flame playing on its surface, the lead is converted into oxide, which readily fuses and runs off to the sides of the cupel, where it is absorbed by the bone ash, the silver being ultimately left behind in the pure state. The appearance presented when a large cake of silver, weighing a hundred-weight or more, is about separating from the lead is one of the most striking in the whole range of metallurgical chemistry. Upon looking into the furnace, nothing is at first seen but a tranquil lake of molten metal, from the surface of which a scum is rapidly being driven to the sides. Presently the smooth appearance of the liquid begins to be troubled, minute granulations are seen to form here and there, small islands start up above the surface, and in the centre, where the depth of liquid is greatest, an accumulation of these miniature islands takes place, presenting a striking resemblance to a volcano. The pool of metal, which may be, perhaps, one foot broad by two feet long, has here rocky eminences of glistening silver, glowing with a nearly white heat, and of all the fantastic shapes and sharp asperities with which astronomers are so familiar in lunar mountains, whilst in the centre stands a peak surmounted by a true crater, in which the molten metal is seen boiling and bubbling, and occasionally shooting out in lava-like streams. As the operation proceeds, similar volcanic eruptions take place in other parts of the liquid, and, finally, the whole of the surface becomes studded with these miniature mountains and present an appearance so beautiful and so strikingly recalling the telescopic appearance of our satellite that it is almost impossible to divest oneself of the idea that similar causes have been at work in each case.

RESEARCHES ON POSITIVE PRINTING.*

BY MM. DAVANNE AND GIRARD.

Chapter VII.

On the Fading and Restoration of Positive Proofs.

Scarcely fifteen years ago, photographic exhibitions presented a very sad spectacle; for, in the space of a few months, often within a few weeks, the proofs that photographers had sent in, brilliant in tone and intensity, became transformed into discoloured, faded, yellowish pictures. A few only among them, due to the superior skill or better fortune of the operators, survived the general wreck, and retained their original colour. Things are much changed in this respect now-a-days, and photographic exhibitions present quite another aspect. The pictures, during the long months they remain exposed to the sun and light, generally undergo no alteration; as they were on the first day, so they remain at the last.

From the date of its foundation, the French Photographic Society comprehended the gravity of this alteration in positive proofs, and the question became the subject of its most serious consideration. Our attention was then called to this important subject by some of the eminent *savants*, whom the Society included amongst its members, and notably by M. Regnault, our president.

Here was, in fact, an interesting subject for study: the formation of positive proofs, their alteration being a very mysterious phenomenon, which science had hitherto neglected to fathom. Without being dismayed at the difficulties presented by the task offered to us, we undertook this profound study, and were happy in being enabled, from the year 1855, to establish the principal points of the question.

Some eminent photographers had already emitted the opinion that the hyposulphite of soda was the cause of the fading proofs; but no demonstration of this fact had been given, and the hypothesis was neglected. Some experimenters, profiting by the labours of M. Fizeau, had, by a kind of intuition, proposed the employment of the salts of gold for toning positive proofs; but the majority of photographers neglected the employment of these salts, the utility of which no one had yet shown.

In a *mémoire* presented to the French Photographic Society, on the 19th October, 1855, a *mémoire* which remains the programme of the long researches we have developed before it, for nearly ten years, we have been fortunate enough to specify the causes of fading in positive proofs, to explain their nature theoretically, to indicate certain processes for rendering photographs permanent, and also to make known a sure method of saving from fading proofs prepared in an improper manner, and restore to them, at least in part, their original value. It is from the epoch of this publication that the regular amelioration of positive printing processes may be dated.

The study of the fading of proofs was, from this moment, nearly complete, and at the present time, we have only to recall the principal features of our first work. One theoretical point, however, still remained obscure; we did not, in 1855, establish the cause of the yellowish colouring, which characterized *faded pictures*; this was a lacune of which, at that time, we understood the importance, and which profounder researches permits us now to explain.

The first point established by us in our researches of 1855, was the following: all the faded proofs contained sulphur, the presence of which is easily revealed, and the quantity ascertained, by the ordinary analytic means. When the proof is wholly faded, yellowed all over, the proportions of sulphur and silver it contains, very nearly approaches the theoretical quantities required by the formula of sulphide of silver, AgS. It was natural to deduce from this observation, that the fading of the proofs is due to a sulphuration. To prove that it was really so, our first care was to submit to the action of sulphurizing compounds proofs newly fixed, and, consequently, formed only of silver, and of argentico organic lake. The alkaline sulphides in solution were our first reagents, and we constantly recognized that, left

* Continued from p. 149.

for a sufficient time in a solution of this nature, the best fixed proofs changed, and assumed a yellow colour. Nevertheless, the change did not take place immediately: a transitory phenomenon preceded it. During the first moments of immersion the proof took a violet black tone, very agreeable to the eye; but this colouring is fugitive, and whether the proof be left in the sulphurizing bath, or withdrawn, at this moment washed and dried, the effect is still the same. After the lapse of a short time, the proof is completely yellowed.

Sulphuretted hydrogen, the action of which we tried after the alkaline sulphides, furnishes us with the means of explaining the succession of these two different phenomena. For, employed in aqueous solution, this reagent behaves with fixed proofs in the same way as the alkaline sulphides; it colours them first black, then yellow, but the result is not the same if we operate under conditions of absolute dryness.

A fixed proof carefully dried at a temperature of 230° upon which a stream of perfectly dry sulphuretted hydrogen is directed, assumes a violet colour; in a word, becomes toned, and, however long the stream of sulphuretted hydrogen is prolonged, the colour does not change. But the slightest trace of water is sufficient to modify this state of things; if the gas reaches the proof slightly moist, the violet colour changes to yellow; a slight immersion of the proofs for a few moments in hot water, or for an hour at most in cold water, is sufficient to cause a proof thus toned to become quite yellow.

The clearness of the preceding experiments leaves nothing to desire; they show that the alteration in positive proofs is due to the simultaneous action of sulphurizing compounds and water; they establish the fact that sulphuretted hydrogen alone, or moisture alone, is not sufficient to cause a positive proof to fade, and that the union of these two agents is indispensable; they permit the explanation of why a proof placed in a portfolio, where a thousand causes may accumulate humidity, is altered, while another proof prepared at the same time undergoes no change from exposure to light in a dry place.

The causes which may place positive proofs in the conditions we have specified, are of three kinds.

1st. Toning baths formed of hyposulphite of soda, either acidulated or charged with salts of silver. These baths were for a long time in favour; but thanks to the researches, of which we published in 1855 the results, they have now almost disappeared from photography; we need not, therefore, dwell upon them any longer, we content ourselves with remarking that baths of this kind must be absolutely banished from the operating room. To this class of sulphurizing compounds, belong also the toning baths formed of sulphide of sodium, or of hydrosulphate of ammonia, which some photographers have had the imprudence to propose, and whose experiments we shall relate, lead us to prescribe their employment also, in the most absolute manner.

2nd. Incomplete washing after fixing in hyposulphite of soda. In this consists the true danger of alteration. For, especially in presence of humidity, the hyposulphite of soda remaining in the proof, gradually attacks the silver with which the latter is covered, slowly changing it into sulphide, and soon, under the influence of this change, the picture loses its pure and brilliant tones, and acquires the tarnished and yellow tones of the *faded proof*. But it is easy to protect ourselves against this danger; in a preceding chapter we carefully explained in detail the practical conditions of fixing, and it will suffice for the photographer to follow exactly our instructions, to have nothing to fear from hyposulphite of soda. The employment of the alkaline sulphocyanides, as we have also shown, gives a still better guarantee against this cause of change.

3rd. Lastly, the sulphuretted hydrogen, which always exists in the atmosphere normally, and especially in the atmosphere of large cities. But this cause of change is of little importance, it should have no more action upon a photograph than upon a pastel, or an oil-painting, and after the results we now propose to explain, its influence is insignificant or *nil*, if the proof has undergone an energetic toning by means of salts of gold.

(To be continued.)

Magnesium Light.—Mr. Hart has just manufactured a handy little lamp for burning the magnesium light, in which a rotating movement is given to the wire as it is unrolled from the cylinder, by which means the tendency of the pieces of the wire to burn off and drop is obviated.

JOTTINGS FOR APRIL.

FROM THE MENTAL SKETCH BOOK OF A PHOTOGRAPHER'S ASSISTANT.

The inimitable pen of Marryat has sketched the portrait of a certain Captain Wilhelm Barentz, whose little soul was so completely crammed with the imaginary beauty of his unwieldy ship that he could think or speak of nothing else, nor could he believe, in spite of daily produced evidence to the contrary, that the general qualities of his *Vrow Katerina* could be surpassed in excellence, and even at the moment when the livid flame shot heavenward from stem to stern, the infatuated man declared that nothing but his darling could produce so glorious a bonfire.

How beautifully does the above given sketch illustrate the folly of adhering to fallacious opinions that cripple progress, and expose the dogmatist to a well-earned ridicule. Among photographers, Mr. Dawson has taken unto himself a "Vrow," and seems determined that no amount of evidence will separate him from his first love. If, in his recent experiments with nitrate of soda, he sought for truth, why confine himself to a solitary sample of paper? We have tried at least fifty, and found one only to fail. At the present time we are, when light permits, printing from thirty to forty sheets per diem, commencing each morning with an exciting solution containing not more than 30 grains of silver, nitrate of soda, about 100. The brilliant surface of the albumen is preserved throughout, and the resulting prints lack no vigour. Such evidence as this is certainly a proof more satisfactory than that derived from experience in extremest miniature.

We learn from the conclusions arrived at by MM. Davanne and Girard, after a series of ingenious experiments in gold toning, they are determined to adhere to the frail "Vrow" alkalinity; attributing to acid the faults justly due to chlorine, whose mischievous pranks might easily be prevented by a little boiling water, which, judiciously applied, imparts to the solution all the virtues produced by long keeping and neutrality. Adhering to this principle, we have our operations completely under control, the acid being the helm with which we steer; the colour of the concentrated gold solution during evaporation of chlorine, the compass by which we are guided. We are thus enabled to tone a sheet of paper with one-fourth of a grain of gold, and this with a choice of tones from sepia to jet black; results which seem at variance altogether to the elaborate calculations and conclusions arrived at by the gentlemen above named. All due praise to them, notwithstanding. An earnest lover of truth, we here deal faithfully with facts that are stubborn, because well proved; facts that have germinated gradually in the soil of scientific principles that have slowly exhibited themselves, inducing us to kick one "Vrow" after another overboard, as more convincing evidence presented itself above ground.

In concluding the present paper, we cannot forbear an allusion to the beautiful carbon process invented by Mr. Swan; a process that contains the germs of a thousand useful applications; a process whose results are, in our eyes, so infinitely superior to silver prints, that we venture to predict its application for photographic printing will be adopted by every photographer of taste. We cannot but express our regret that a clog is to impede its way in the form of a patent, an ill-advised proceeding, that will prevent progress, and entail on Mr. Swan the miseries of endless litigation. We believed that had he named any reasonable sum, he would accept as a return for the time and money expended in bringing his ingenious labours to perfection, no difficulty would attend its collection, and the matter would be easily settled. As the thing stands, the patent right may be easily evaded, and royalties mocked to scorn.

[We think our contributor errs in his view of the difficulties of maintaining the patent, and also in fancying that remuneration would readily have been obtained by other means.—Ed.]

ON THE PRINCIPLE OF IMITATION AS APPLIED TO THE DECORATIVE ARTS.*

Now, I know it will be asserted that such art as I describe is not high art. Let me admit the truth of the assertion. I have already said that art is great only as it employs the intellectual faculties. The laws of perspective are now well known, and the application of them is so far mechanical. But all men are not Wilkies, nor Paul de la Roches, nor Turners, nor Roberts, luckily, or else we should have everybody producing works of high art, with nobody to buy them. It is to be feared that in such circumstances the only employment for an artist would be akin to that of Vishnu—the contemplation of his own perfections, an occupation, profitable it may be, for gods in whom humility is no virtue, who neither eat nor wear clothes, nor beget children, but not for men who do all three, and who, to be estimable, must be humble withal.

But no reasonable man would deny to an artist the right of exercising, for his own profit, and for the pleasure of his fellow men, such talents as God has given him merely because they are not so transcendant as those of the great masters we have named.

The fact is, as I have already indicated this crusade against deceptive imitations, though neither essentially pre-Raphaellite nor mediæval in its character, is a phase of the fashion which has exhibited itself, and is ruining its course in architecture, painting, and religion. Strange, practical paradoxes into which theorists are sometimes dragged, into what adhesive and traitorous quagmires of delusion and absurdity are men frequently carried when they take to ride stiff-necked hobbies. I have seen pictures of the pre-Raphaellite school in which the imitation was carried so far as to be startlingly deceptive. An imitation of what? Literally of withered leaves and straws, painted with a greater amount of care and finish than had been bestowed, in the same picture, on the human face divine, *so* startlingly deceptive that it seemed as if the straw had been packed in between the glass which covered the picture and the panel on which it was painted. Yet men who denounce all imitations as sinful, who cannot find terms sufficiently strong in which to condemn the man who spends his time and gains his livelihood by imitating the delicate veining or the rich and varied colouring of a marble, exhaust the English language for words to sound the praises of a school which admits of such puerilities.

But deception is allowed in many cases besides painting. What is that which forms the charm of novel writing but its deceptive character? It would be a new style of objection to Robinson Crusoe, that no one could read the book without feeling persuaded that it narrated facts, or to Sir Walter Scott's delineations of Baillie Nicol Jarvie and Dominie Sampson, that through their verisimilitude, they, the creatures of an imaginative brain, had taken their place as historical personages. What is the source of the delight we take in dramatic representations? Among all the objections which have been urged against the stage, did any one ever hear it asserted that actors, in their professional capacity, are deceitful above all men, and desperately wicked? Could it be said that Macready was an unprincipled scoundrel, because no one could see him perform without believing him to be animated by the passions which his words expressed? Over and above the interest of a drama which, although badly performed, may to some extent, sway the feelings the deceptive character of its representation forms its chief interest, and in its appeal to the imagination, constitutes the performance a work of art. We admire the acting of a man who personifies a passion, while we might disregard or despise one actually under its influence.

What would Carlyle say, if arraigned before the bar of public opinion, for the form which some of his great works have taken? If he were charged with imposing on the public the belief that his Sartor Resartus was founded on a volume he had received of Professor Teufelsdröckh, from the press of Stillsweigen und Geschellschaft, of the town of Weissnichtwo; if it were stated in aggravation of his crime, that he was an old offender; that the effect of the deception which, in this case, he had practised —to use the identical words employed in denouncing that class of imitations which we are now engaged in defending—was to cast a suspicion on the existence of his Abbot Sampson, and the genuine Chronica Jocelini de Brokelonda, and on every bit of genuine history afterwards encountered. Do not let it be supposed that these cases are irrelevant. They are truly in point, and they are fair illustrations. The sin which is denounced is the so-called deception, common to them all, and the consideration of it as exemplified in such cases, may prepare us for its admission in those others which are to come more immediately under our consideration. It must be observed that these dramatic representations, and these works of fiction, like painted marbles, deceive only those who have not knowledge or penetration enough to detect the imposition. In this case, if the deception be the crime, the balance of argument, according to the views of our opponents, is in our favour. The painting contains internal evidence to reveal its true nature, while the real character of the acting, or of such writing as that in which Carlyle indulges, must be ascertained from certain conventionalities known only to the initiated, or from extraneous sources.

[The writer proceeds to illustrate that the impropriety of imitations chiefly arises from an intention to deceive, and proceeds:—]

Precious stones are worn not for their beauty alone. If they were so, then the false would serve the purpose equally well, and no stigma would attach to their use, for they are quite as beautiful as the real, and, indeed, it is difficult to tell the difference between the two, for even connoisseurs are apt to be deceived in such matters.

Gems are worn on account of the dignity they confer as objects of cost. Hence the counterfeit meet with condemnation from all persons of education and refinement. A woman who wears false jewels intends that they should pass for that which they are not. She is a pretender to a rank and position to which she has no claim. She is guilty of a vulgarity—an impertinence—a sin, if you will—from which every one with sense and propriety would instinctively shrink.

There is a palpable fallacy contained in an argument which places in the same category imitations of objects which are used solely or chiefly on account of their beauty, and those which are used solely or chiefly on account of their suggesting ideas of cost. A fancy wood or marble is an example of the former—a precious stone of the latter. You may deceive by making an article which possesses little real value resemble a costly one, but to speak of deceiving as to beauty is a simple absurdity. The appearance of cost and value may exist without the reality—the appearance of beauty and the reality are one and the same thing.

Such a thesis as that which we have been disputing could not be maintained consistently throughout, so we find it stultified by the admissions of its author. "Gilding," he says, "has become, from its frequent use, innocent. It is understood," he says, "for a film merely, and therefore is allowable to any extent." I cannot admit the abstract justice of the doctrine contained in this passage, for it would go far towards justifying any practice, however absurd, which might happen to have the sanction of antiquity, and it is certainly altogether at variance with the principle on which imitations are condemned by the same author. According to this doctrine, gilding must at one time have been wrong. But that which is originally wrong can never be made right by repetition. On the contrary, it is common to hold that what is here advanced as a palliation can only serve as an aggravation of the offence.

It is hoped that we have already found sufficient justification for using imitations of materials, such as fine woods and marbles, in all legitimate situations; but this passage, if we could avail ourselves of it, and if justification were needed, would afford all that could be desired, for the use of these imitations has been for a long period so common, that however deceptive they may be, they will seldom, if ever, pass for aught else than what they are.

These remarks on gilding betray a total misconception as to what decoration really is. Decoration is a thing of surface not of construction, although the construction will frequently indicate what the decoration ought to be. You have no more reason to suppose that a thing is solid gold because it is gilded on the surface, than to suppose that a lady is silk because her outer garment is composed of that material, or that you would find the downy surface or the delicate tints of the peach at whatever point you might intersect it. The apology, therefore, tendered for gilding is not only superfluous, but of a character which could not have been accepted had an apology been necessary.

This brings us to point out, as we proposed to do under the

* Continued from page 199.

third division of our subject, the qualities which give their value to decorative appliances. These, which we name in the order of their importance, are—

1st. Beauty.
2ud. Durability, and
3rd. Costliness.

We have just been speakiug of gilding. For its employment we require no other apology than the possession of the above-named qualities, and in this respect it stands on precisely the same footing with almost all other decorative appliances, cement or plaster, metallic coatings of bronze, silver, or gold, paint, silk, veneers in wood, marble, or freestone. Our principle is of universal application. A lady makes the dress which is to be seen of silk, her under garments of a cheaper and less showy material. You veneer a plain, inexpensive wood with one of a richer hue and of a more expensive quality. You coat your brick or rubble walls with cement, with paint, with ashlar stone, or with marble. They are understood to be mere coatings, thicker or thinner as the case may be. Ziuc is coated with bronze, bronze with silver, and silver with gold, and in doing this we simply follow a natural instinct, and the example which nature herself has given us.

We shall now try how far stucco and scagliola, or painted imitations of marbles, possess these three qualities of beauty, durability, and expression of cost.

First, as to stucco. It seems to be felt necessary that some expedient should be adopted for adorning the unsightly brick buildings of which such a town as London is chiefly composed. This is effected by the material under discussion, either by an entire coating, or by means of projecting facings, thus adding force to the outlines and principal features, and contributing to the composition, those elements of light and shade so essential to the beauty of architecture, and in which brick buildings are generally so deficient. It certainly is not the fault of bricks that they are not ornamental, seeing they can produce such buildings as the Ospidale Maggiore of Milan, the Certosa of Pavia, or even such examples of street architecture as those recently erected in Cheapside, which are now daily arising around us. But the ornamental bricks, or terra cotta, used in the construction of these buildings, being simply moulded as is the stucco or cement, are liable to precisely the same condemnation. Brick architecture of such a character would leave nothing to be desired, but it is to be feared the expense will interfere with its general adoption. The expedient usually resorted to for getting rid of the dull uniformity and flatness of brick erections, that of bands, lozenges, and squares of various colours, seems to me as barbarous as the tattooing of the savage, and of precisely the same nature. The lines and forms seem to destroy the contour of the building by substituting stronger markings than those which are presented by the solids and vacuities, they withdraw attention from the principal architectural features—from the form and outline of the building which give it character and expression, and in which, as in a face, the beauty ought chiefly to be found.

Stucco, then, supplies a want—in cases where stone is not to had or where it is too expensive for general use. In regard to its possession of the three qualities we have named; in beauty it is nearly equal to stone, because it admits of the same identical forms, and if properly treated the difference between the two surfaces is scarcely appreciable; in durability it is, of course, inferior to stone. But such beauty and such durability as it does possess are absolute qualities, and in regard to these stucco does not occupy the position of an imitative, for it is obvious that beauty and durability do not admit of imitation. As to expression of cost, stucco expresses more cost than plain unadorned brick, and less than stone. It is, therefore, a less noble material than the latter, so that its use will be restricted by the conditions to be afterwards stated.

We may here remark, in passing, that so long as stucco remains unchallenged as a decorative appliance for interiors, it will be difficult to show why it should not be employed—subject, of course, to conditions—on exteriors also.

Scagliola and painted imitations of marble stand on precisely the same footing. Their beauty arises from various sources. One of these is inherent, due to the colour shades and veining, which, constituting the loveliness of the real object, are found, only in a less degree beautiful, in the representation. The second source of beauty is the taste, skill, and ingenuity displayed in the execution of the imitation, which the practised eye at once detects, while a third class of beauty may be discovered in the deceptive character objected to, and which forms, we hold, a legitimate appeal to the imagination. No doubt such imitations are wanting in beauty of the highest class; they do not engage the greatest faculties of the artist, they do not suggest great thoughts, but such beauty as they do possess is derived from sources which are quite legitimate.

In durability they are, of course, much inferior to real marbles, although greatly superior to most other styles of painting in use for internal decoration. From the smoothness of the varnished surface they are easily cleansed, and at the end of thirty years will be found to have suffered less from tear and wear than plain paint would have done in a third of that time.

As expressive of cost they are of no mean value, though from their inferiority in this respect to the originals, they will be excluded from use in many cases by one of the conditions I shall specify.

(To be continued.)

Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting of this association was held in Myddelton Hall, on Wednesday evening, April 20th. Mr. G. Dawson in the chair.

The minutes of a former meeting were read and confirmed, after which the following gentlemen were elected members of the society: Mr. W. Sandford, and G. W. Berridge.

The Chairman stated that Mr. Bedford had presented 20 very choice photographs to the Society, which would be ready for inspection in the album of the Society at the next meeting. He also announced that the presentation print would be ready at the next meeting; the photograph selected was The Brook at Kenilworth, by Mr. Bedford.

Mr. Bockett then read a paper on cheap contrivances for photography, in which he described various methods of making from cheap and accessible materials, various appliances for photographic operations; a packing case, for instance, by a little contrivance, became a pedestal. Amongst the most ingenious contrivances described, was a frame for a screen, which enabled the operator to stretch the canvas tight at any part, should it become slackened. It consisted of two distinct frames, one behind the other, the canvas being attached to the back frame. A series of screws in the latter working against the front frame permitted any amount of strain being applied at any portion. A variety of other contrivances were described and exhibited, some account of which we shall give in a future number.

Mr. W. Warwick King, after thanking Mr. Bockett for the useful information and ingenious hints his paper supplied, remarked that the negative box, open at both top and bottom was not new; he had had one in use for years; he thought it would be better if the hinge in Mr. Bockett's were at the side instead of the bottom. As regarded dadoes and similar ornamental accessories and backgrounds, he should be glad to see them all abolished. He thought them detestable; pictures containing them also generally presented the anomaly of people turning their backs upon what was intended for beautiful scenery. Balustrades were quite as objectionable. Of course, there were exceptions; when artistic taste was used in such things, as in some of the pictures by Southwell Brothers, the result was often very fine; but, as a rule, they deserved the highest reprobation. He did not like the printing-frames without a glass, as a portion all round the negative was necessarily cut off by the rabbet of the frame. Mr. King proceeded to describe a cheap form of printing-frame he used, which did not possess this disadvantage. He again thanked Mr. Bockett, and remarked that if every photographer would relate his experiences in the manner Mr. Bockett had done, much advantage might often be derived from it.

Mr. Bockett said he agreed with much that Mr. King had said about backgrounds. His remarks had referred to the method of meeting a want, without reference to the good taste of the thing.

The Chairman pointed out another disadvantage of the printing-frames in which the negative rested on the rabbet of the frame, instead of on a glass; if they were out, and rain came on when the amateur was not in immediate attendance, the wet got under, and often spoiled the negative.

Mr. Wharton Simpson had not found that difficulty, as he found that a well varnished negative was not injured by getting wet.

The Chairman remarked that much better photographic varnish could be obtained now than a few years ago. When the chloroform varnish was used, a negative getting wet was inevitably spoiled.

Mr. King frequently used collodio-albumen negatives without varnish at all, and had lost them from allowing them to get wet.

The Chairman called attention to a very convenient and singularly cheap camera for card pictures, by Koch, of Paris, made after a suggestion or design by Dr. Van Monckhoven. It was made of walnut, with a folding tail-board and bellows-body, and had a swing-back and various other conveniences, at a cost of 40 francs. He also called attention to a stereoscopic triple lens, by Mr. Ross, which had an equivalent focus of 4½ inches, and covered 5 inches. After some conversation,

The Chairman called attention to one of Mr. Swan's prints, 10 by 8, exhibited by Mr. Simpson. This would have an especial interest for the members, as it was from the same negative by Mr. Wilson, from which members had received presentation prints; in this instance the print being, as they would observe, reversed. By the comparison thus afforded, it would be seen that the carbon print was decidedly superior to the silver prints, having more delicacy and vigour.

Mr. Simpson remarked that members had before seen excellent specimens of portraiture by Mr. Swan's process. The picture before them, and some others he would now pass round, would show that the process was just as effective in landscape work.

Mr. King said the prints were perfect in all respects, he thought, except the tone, which to him appeared too cold. He should have been glad if they had had the warm purple brown of a silver print.

Mr. Simpson answered Mr. King by producing some of Mr. Swan's prints of the exact tone described, and remarked that the tone was entirely under the control of the operator, as any pigment might be used, as well as indian ink. It would only be necessary to ascertain which pigments were permanent, and then combine them, to produce any colour.

The Chairman then called attention to some interesting panoramic photographs by Mr. Sutton, including an angle of from 110° to 120° in every direction. They were in the shape of a segment of a sphere of about 10 inches diameter, and were taken with a lens of 5 inches focus.

After some conversation, Mr. Dawson vacated the chair, which was taken by Mr. King.

Mr. Dawson then read a paper on "Some Imperfections in the Dark Slide at present in use." He remarked that it was somewhat odd, seeing how much ingenuity had been devoted to the production of different forms of cameras for almost every purpose, that scarcely any attention whatever had been given to the dark slide, which was almost as full of defects now as it had been at the commencement of the art. Its defects were, first, a tendency to fit too tight in the camera, which caused it to jam when it got the slightest swollen with wet, and to cause dust by friction. Second, the sliding shutter was made too tight, causing obstruction, the pulling up of the slide bodily, dust, and splashes. Third, the groove into which the shutter closed at the bottom was a receptacle for drainings of silver solution, causing many spots, &c.: if the portion of the groove next the sensitive plate were cut flush with the framework, this evil would be removed. Fourth, the brass hinges of the shutter were a constant cause of dust, as particles of the metal were continually removed by abrasion, and falling on the plate, became a constant, source of pinholes. The old system of using leather was greatly superior. Fifth, the system of varnishing the inside was objectionable, because the varnish got rubbed off, causing dust, and because at times the exhalation from the resin or its solvents caused abnormal reduction and fog. Sixth. Every dark slide ought to have a well at the bottom, into which the nitrate solution might drain; a piece of blotting paper folded up and put into this well, not only prevented splashing, but prevented the waste of nitrate of silver.

The Chairman, in proposing a vote of thanks to Mr. Dawson, expressed his concurrence with many of his suggestions, and after a few remarks the subject dropped.

The Chairman then showed some prints on paper prepared with Valata resin, a product of British Guiana. The paper was supplied by Messrs. Horne and Thornthwaites. The result was, he thought, good where pictures without the glaze of albumenized paper were desired.

Mr. Bockett, asked if plain paper would not give equally good results.

The Chairman, said he thought that more detail and delicacy were obtained, than were found in plain paper prints.

Mr. Simpson, pointed out the fact that with the carbon process, it would be quite easy to get rid of glass, by dissolving off the collodion film with ether.

The Chairman, then showed a small camera, by Mr. Ross, by which four medallion pictures could be taken on one plate, with one lens, which was made to travel round the front of the camera.

After some further conversation and examination of apparatus, the proceedings terminated.

Amateur Photographic Association.

A Council Meeting of the Amateur Photographic Association was held April 14th, at 12, York Place, Lieut.-Col. The Hon. Dudley Fitzgerald De Ros in the chair. The minutes of the last meeting having been read and confirmed, the following members and subscribers were proposed and elected:—

The Hon. Ralph Abercrombie; The Hon. Miss Vesey; North Rees, Esq.; H. Maxwell, Esq.; W. Williamson, Esq.; W. S. Hobson, Esq.; Miss L. Moseley; M. F. Carter, Esq.; Lieut. H. W. J. Senior; R. H. Mitchell, Esq.; Mrs. T. J. Bell; Major Durnford; C. Larking Esq.; Lady Staples; The Hon. Miss Beatrice Vesey; Rev. A. Johnson; Capt. C. C. Taylor; W. H. Humphreys, Esq.; Lieut. W. E. T. Bookey; E. Larkiug, Esq.; — Clerk, Esq.; C. Horsley, Esq.; T. Spencer, Esq.; C. Martyn, Esq.; Rev. H. Holden; Mrs. Leith.

The question of an exhibition of the society's photographs was resumed, and, after a lengthened discussion, it was resolved to hold one at 12, York Place, as soon after the new negatives had been received as possible.

The Secretary then laid before the meeting a detailed account of monies which had been paid accordiug to Rules 10 and 13. The account included the names of nearly sixty members, with sums varying from a few shillings to several pounds.

The Secretary having stated, in reply to a question from Mr. Glaisher, that several of the members and subscribers had not yet received their pictures, it was resolved, on the motion of Mr. Glaisher, seconded by Mr. Gooch, that henceforth members and subscribers who shall not have selected the pictures due to them within two months of the close of each subscription year (which dates from June to June), shall have such pictures sent to them as shall be selected by the referees.

A. J. Melhuish, *Hon. Sec.*

Correspondence.

FOREIGN SCIENCE.

[from our special correspondent.]

Paris, April 27th, 1864.

Some new preparations of iodine and bromine, made by M. Dietzenbucher will, it is hoped, be successfully applied to photography. A gramme of pyrogallic acid dissolved in 20 grammes of water, will dissolve, when cold, 20 grammes of bromine, and 6 grammes of iodine when heated. The solutions dissolve in water in all proportions. Upon heating the liquids to about 480°, the pyrogallic acid is converted into metagallic acid, setting the iodine and bromine at liberty. Medical applications of these solutions, both internally and externally, have given very excellent results; showing that they may advantageously replace the alkaline bromides and iodides.

Dr. Duchenne, of Boulogne, has presented to the *Academie des Sciences* his researches in the microscopic photography of the nervous system, with an atlas of photographic illustrations. In this work, he has aimed at representing the nervous system, both in its normal and pathological states, by means of photography. To accomplish this object, it was necessary to be, at the same time, familiar with the use of the microscope, and with photographic manipulations; and it was only after many years of experiment, that the doctor succeeded in obtaining with great distinctness, from microscopic preparations, the representation of the nervous elements, and of

longitudinal and transversal sections of the different parts of the nervous system, magnified from 200 to 2,000 diameters. He now presented to the *Academie* two series of these studies, forming an atlas of 31 photographic pictures. The first series exhibits, magnified from 200 to 1,000 diameters, the state of the roots of the nerves cut transversely, derived from many cases of the morbid species, which he describes under the title of "progressive locomotive ataxis." The second series represents the normal state, and magnified from 10 to 200 diameters of the different portions of a transversal section of the spinal marrow of an adult man.

MM. Davanne and Girard having now brought to a conclusion their researches on positive printing, which have occupied them for ten years, and required many thousands of experiments, they have presented to the *Académie des Sciences* a summary analysis of their labours, which possess very great interest and importance, having led to the important result of establishing the conditions under which permanent pictures in salts of silver may be obtained. In their examination of the various methods adopted for the treatment of residues, they show that only 3 per 100 of the silver employed is really turned to useful account, and of the remaining 97 parts at least 93 may be recovered.

It is as unlawful in France for a person to possess a printing press, either for graphic or typographic purposes, as it is for a person to possess a still in England, unless duly registered and licensed. This is somewhat awkward for the photographer who desires to glaze his proofs himself, and the question has been recently raised whether a photographer is bound to obtain authority from the prefect of his department to keep a press on his premises. Article 13 of the Act of 21st October, 1814, sets forth that—

"Clandestine printing-offices will be destroyed, and the possessors fined 10,000 francs and imprisoned six months. Every printing-office will be considered as clandestine if not declared at the general board of direction for printing, and permission obtained."

This rigorous penalty has already been applied to a photographer, who was found guilty of unauthorized possession of a cylinder press: it is true, the penalty was not enforced, but the risk still exists. The presses generally employed by photographers are, to all intents and purposes, lithographic presses, and therefore strictly within the meaning of the Act.

M. de Brebisson has addressed a note to the editor of the *Moniteur de la Photographie*, in reference to M. Vernier's article on Dry Collodion, in which this eminent photographer reproached M. de Brebisson with employing honey as a coating for preserving the sensitiveness of collodion, remarking that the surface became sticky, and presented many serious objections to use. M. de Brebisson states, that if M. Vernier had glanced his eye over the work published by him on Dry Collodion, he would perceive that in speaking of honey, first proposed by Mr. England, he pointed out its defects, and announced that he preferred various caramels, added to gum arabic, as giving a more uniform coating, drier, and one that will keep better." M. de Brebisson goes on to say:—

"The effect produced by the presence of a reducing agent in the preservative coating, has been fully explained by MM. Poitevin and Blanquart. The action of such a substance is powerfully seconded by the addition of gummy and sugary matters, which seem to be calculated to maintain the molecular arrangement of the sensitive film. It is indispensable that the prepared plates be kept in a perfectly dry place, otherwise the least trace of moisture causes an injurious deliquescence.

The development of the picture by iron, permits of a slower exposure, and gives much delicacy to the negative, and is generally to be preferred. In this case the development is sometimes unequal, but this inconvenience disappears upon adding a small quantity of the reducing agent to the bath of pure water in which the collodioned and exposed plate is immersed, immediately before submitting it to the operation necessary to bring out the picture. A small pinch of gallic acid, or a few drops of the ordinary solution of pyrogallic acid will suffice in the bath. After this immersion, the plate is washed before the solution of sulphate of iron is poured on.

WASHING PRINTS.

Machines for washing prints are attracting much attention. Mr. Hanbury has ingeniously adapted the old "Balancier Hydraulique," of Perrault to the purpose. A similar machine, introduced by Mr. Sang, appears in the last number of the *Journal of the Photographic Society*; and in the number of the News which I received to day, I find a third arrangement for print washing, registered by Mr. Williams. Mr. Sang prefers the vertical lifting of the print. I agree with him. I am convinced that the thorough cleansing of the sheet can best, and most rapidly, be effected by constantly dipping it after a certain amount of draining, while held vertically, into fresh water. I think that the proprietors of large printing establishments might well consider whether the principle of an old hydraulic machine, of which a plan is given in the first volume of the *Mechanic's Magazine*, might not advantageously be introduced for the rapid and self-acting washing of prints. It consists of a bucket, or water-box, with a valve below, which, when filled with water from a constant stream, falls and lifts the counterbalancing weight opposed to it, at the other end of the beam from which the box is suspended. When nearly down, the valve, which has a shank, or projecting pin below, begins to rise, and before the momentum acquired in the fall shall have carried the box itself to the bottom, all the soiled water which it contained will have been emptied, the counterbalancing weight will again raise the box, to be again filled, carried down, and emptied.

Let the water box contain diaphragms, as recommended by Mr. Sang. The prints will be continuously and rapidly plunged into clean water. This will become soiled by contact with the "hypo," it will flow away, and the print will be left free to drain off, while in a vertical position for a short time. Again fresh water will flow in to be again soiled, and pass off through the valve.

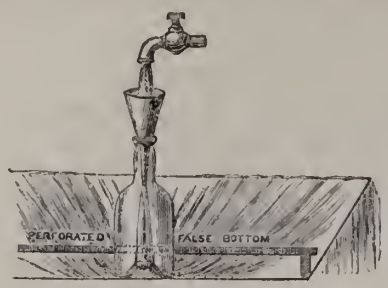
The principle is so simple, that it will be probably adopted in some large establishment where it would be desirable to wash prints thoroughly and rapidly by a self-acting machine; but having myself acted on it, for the purpose of pumping water, it may be useful to state to what extent I failed in its application.

I erected everything on too large a scale. My working barrel was 6 inches in diameter, with a stroke of 24 inches. The water-box had to be very large, and, as the stream was continuous and plentiful, the action of the several parts was so rapid and so violent, that the machine would have soon broken itself to pieces. By a very simple contrivance connected with the beam, this difficulty can be overcome. The time at which the water shall be allowed to flow into the box, and its quantity (or the rapidity with which the box shall be filled), can easily be regulated. It is unnecessary to trouble you with a description of the manner in which I propose to meet the difficulty. Any ordinary mechanic can devise his own plan for regulating the action of the machine. There is no peculiar merit in mine, but if any of your readers desire to see my plans I will send them to you.

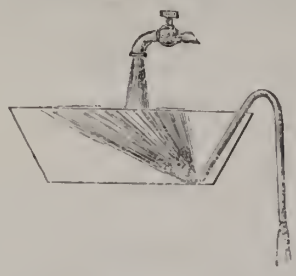
For ordinary print-washing the following suggestions may be worth attention, as the use of a syphon is avoided, and any sort of vessel can be used.

I place a small cylinder, open at both ends, in the washing pan. In my case it is a large, twenty-ounce measuring glass, the bottom of which had been accidentally broken off. This is placed immediately under the tap, and a small stream is allowed to flow into it. The water spreads out below, and creates a fair upward movement of *nearly* the entire body of water contained in the vessel and flows over the edge. There must be a latticed board or a perforated false bottom

in the pan, so that the prints shall never lie *on the bottom* of it, and *below* the line of the movement of the water. A common wine-bottle with a funnel in its neck, and a hole in



the bottom of it, would answer perfectly. I consider this arrangement preferable to the syphon. A larger portion of the water contained in the vessel is displaced and changed. In the use of the syphon a current is formed, shaped like a



funnel, which leaves a large portion of the water contained almost in a state of stagnation, without much movement, and but little changed. I have the honour to be, sir, your obedient servant, N.

April 13, 1864.

THE PHOTOGRAPHERS' PROTECTION ASSOCIATION.

Sir,—In the interests of photography, I incline to send you the following particulars of some recent proceedings of the Photographers' Protection Association, with which it seems right that its subscribers should be acquainted. I should premise that, as far as concerns the principles for the forwarding of which the association was formed, I have long before that time advocated and practised them, when the dealing in pirated copies was the rule rather than the exception, and have strictly adhered at all times, as a matter of principle, to the sale of what I had reason to believe were genuine portraits. I will endeavour, as far as possible, to confine myself to a simple narrative of facts.

Some time since, in selecting from the stock of a French dealer a number of the productions of Desmaisons, Disderi, and other continental photographers, I chanced, among the parcel, to become possessed of a few copies (about two dozen) of a portrait of Garibaldi, which were represented to me as being also French portraits, but which were, in reality, copies from an English copyright engraving. Of these I had, at the time I am referring to, sold 3 or 4 copies. I was then favoured with a call from a clerk in the office of the solicitor to the above-named Association, who very civilly informed me of the character of the photograph, and left me the usual "declaration" to sign, with a note from the solicitor, stating that he was instructed to commence legal proceedings against me for the sale, and to recover damages for the wholesale quantity already sold. I immediately wrote to the solicitor, expressing my regret at having inadvertently sold photographs of this description, and offering at once to deliver up all unsold copies, with the name of the party from whom they were bought. In reply, I received a short note, asking to be referred to my solicitor, and stating that each "*pirate, or dealer in piracies,*" is required by the Association to contribute towards the expense of "*bringing them to justice;*" but that, if I promised not to *offend* again, they would generously *let me off*, on payment of a mitigated fine of 40s. Not being able to see that it was in the province of the Association or their solicitor to fix arbitrary damages on those who had never intentionally offended, or put them to a penny of expense, I wrote in reply, repeating my offer already mentioned, and also to pay, as an acknowledgment of his client's right, a small sum for every copy sold. At the same time, I entered a protest against the use, in my case, of the expressions I have italicized above, and expressed my opinion of the harshness of the proceedings threatened. The reply to this communication was by return of post—*the writ*—served upon myself personally; accompanied by a note that, although the protest contained in mine "did not call for clemency," and although he could make me pay not only heavy damages, but his own costs, "to the amount of £100 at least," (for the sale of three or four photographs!); they would still continue their magnanimous clemency by letting me off with the additional expense of the writ £2 12s. 6d. Not choosing to incur the expense and annoyance of defending a legal action, I here struck my colours, and, again under protest, sent a cheque for the amount, receiving in return, with the receipt, a note, stating that, "upon handing over the spurious copies, the action shall be at an end." This was immediately done; and hereupon, one would have thought the matter *would* have been at an end. But not so. It seems that the solicitor's clerk was unsuccessful in finding the French dealer at the temporary residence, which I had given as his London address, some months before; whereupon I receive another letter, requiring me to send "further particulars of this person's whereabouts;" and notwithstanding the assurance given above, adding "the action must not be considered as settled, until I receive this information."

I make no comment on the above narrative, leaving this for your readers to supply; but, knowing from personal intercourse, the high character of many of the subscribers to the Photographer's Protection Association, I think they can hardly be aware of the manner in which their Association is brought to bear on those who are the warmest friends to the principles on which it was formed.—I remain, yours respectfully, Alfred W. Bennett.

5, Bishopsgate Street Without, London, E.C.,
23rd April, 1864.

A FEW WORDS ON NEGATIVES FOR ENLARGEMENTS.

Sir,—Few photographers, compared with the many, are at all acquainted with the kind of negative required for the purpose of enlargement, the great majority supposing that one suited for ordinary printing will answer. Such is not however, the case. I very frequently have negatives sent me that are so dense that they afford little or no half-tone, even by contact printing, much less in an enlarged print by the solar camera. When the light is transmitted through such negatives, instead of a brilliant picture presenting itself, it looks as if a thunderstorm was coming on, rendering necessary about four times the exposure of a negative proper for the purpose, and after all yielding very imperfect results, and causing much disappointment, that the enlarged proof is equal to a card print from the same negative.

It may not be amiss, as the season is fast approaching (especially as large pictures are likely to be in great demand), to say a few words on the subject, commencing with the lighting the sitter. I would recommend a light between an artist's light and a photographer's light, in order to secure sufficient rotundity; as a rule, white calico reflectors will be found of great service to light up the shadows, more especially for aged people, or those with deep-set features. Supposing the sitter to be now properly lighted, which may

be known by strictly observing the eye, that organ being the dominant feature, requires the most careful treatment, the light and shadow in and around the eye must be balanced with the utmost accuracy, in order to convey the necessary vitality and intelligence, the light reflected in the eye should be a small brilliant well-defined spot. As a rule, if the sitter is well posed, and the eye properly lighted, the other part of the features will fall in in due course.

The accessories must now receive careful consideration, and by judicious management, breadth and freedom may be obtained, bearing in mind that broad lights must be supported by broad shadows, avoiding everything too highly polished, whereby sparkling lights would be reflected out of place.

The background also plays a most important part, it must be soft and graduated, supporting the figure in such a manner that the latter may not present the appearance of being cut out, and pasted on, all passages that are beautiful in form should be relieved, and all that is inelegant should more or less mingle with the shadows in the background. A fine effect may be secured by hanging a curtain on the illuminated side of the figure, and drawing it backward or forward as the case may require, taking in or leaving out the curtain *ad libitum*, gradation in the background will be thus secured. So much for the artist's part of the matter, the importance of which I need not remind the true art photographer. Now comes the photographic business. Photographers generally will experience a difficulty in keeping the negative sufficiently thin (I would here state my willingness to give an opinion on any negative that may be sent me for that purpose); it must be well exposed, but not overdone, using as small a stop as practicable. It has been often said that an over-exposed positive will do for the purpose, but I have never found that to be the case in my practice, for when such pictures are viewed by transmitted light, the detail will appear very weak, and the shadows slightly veiled, presenting an appearance altogether unfit for the purpose. A good bromo-iodized collodion with an acid nitrate bath, and iron development, I have found gives the greatest amount of half-tone, keeping the shadows perfectly clean, and works well in hot weather.

The utmost care must be taken to obtain the negative microscopically clean. There is no objection to the negative being varnished, if done with care, and with a varnish that dries perfectly bright and clean. E. Aldis.

12, *Arthur Grove, Kentish Town.*

Photographic Notes and Queries.

Testing Glass for Dark Rooms.

Sir,—Having had some experience in the testing of yellow glass &c. for the dark room, I think it may be useful to photographers to know that the spectroscope is not to be depended on for that purpose. I have found repeatedly that samples which have given no indications of the transmission of chemical rays, when tested by their visible spectra, have proved quite useless under the test of a wet collodion plate exposed to sunlight. This is not surprising when it is borne in mind how far the chemical end of the spectrum extends beyond the visual or visible portion. It might, therefore, be expected that these rays might impress the plate when so tried. I would suggest that any medium which is to be used for the window of a tent or dark room, should bear the test of a wet plate, as nearly in contact as possible, and exposed to *bright sunlight* for the length of time occupied in manipulating a plate; say eight to ten minutes. Unless this is the case, I do not think it can be considered fit for the purpose, particularly for out door-work, when it may at times be necessary to place the window facing the sun.—I am sir, yours truly, Chas. W. Smartt.

Clapham, April 25th, 1864.

[It is unquestionably desirable to obtain the utmost possible degree of security in working in the dark room, but we think the test Mr. Smartt proposes almost unnecessarily severe, as a sensitive plate never really need be subjected to eight or ten minutes sunlight either close to the yellow glass or remote from it. In our own experiments we have generally found that a piece of glass which cut off all the blue and green rays when examined in the spectroscope was perfectly safe in practise. As regards the invisible highly refrangible rays beyond the violet, it is generally held that they are the first to be cut off, not readily passing through glass even when of the ordinary colour, still less through yellow glass. However, we never counsel carelessness or indifference on this subject, as we believe the unsuspected presence of actinic light in dark rooms is often a source of fogging, when the plates are very sensitive.—Ed.]

Freak of a Nitrate Bath.

Sir,—During the past week I met with the following phenomena, and I desire to know if other gentlemen, professional or otherwise, met with the same.

1st. The nitrate bath, of 86 oz. (one nearly new), made after the formula given by Mr. Thomas, became nearly insensitive, giving, even with protracted exposure, weak, smudgy, poor pictures. The iodide used was potassium, as recommended.

2nd. Another bath of 35 oz., made after the formula of Perry, of Sheffield, iodized with ammonium, gave splendid results, the plate being ready for use in 30 seconds, and the sensitiveness was unsurpassed.

3rd. A collodion, bromo-iodized with potassium and cadmium, gave poor results, whilst one bromo-iodized with iodide and bromide ammonium, was everything that could be wished.

The lenses used were those of Grubb and Ross.

Yours very truly, W. H. Warner.

Ross, 27th April, 1864.

Talk in the Studio.

New Copyright Bill.—We learn from the *Journal of the Society of Arts* that the Artistic Copyright Committee met on Tuesday week, to consider what steps should be taken in reference to Mr. Black's Bill for the consolidation and amendment of the Acts relating to Copyright in Works of Literature and the Fine Arts. The committee approved generally of the objects of the Bill, but considered that the details required careful revision, and they directed a communication to be made to Mr. Black to that effect, with a request for an interview with that gentleman, to which he has consented.

Lenses for Card Portraits.—We have recently had two or three lenses for card portraits sent for examination. We have not had leisure for further trial than is involved in the very practical test of taking two or three negatives with them. The first is Mr. Squire's Extra Rapid Lens. It is a portrait combination, the lenses being a diameter of 2¼ inches, with a fixed central aperture of 1¾ inches. The back focus is about 4¾ inches, the equivalent focus between 6 and 7 inches. It is furnished with rack and pinion and central stops, the outer tube or jacket working over the groove carrying the diaphragms. The image on the ground glass is brilliant and well-defined, and the negative obtained possessed the same qualities. The curvature of the field renders it less suitable for standing than for sitting figures or busts; but as it works very rapidly, we should think it peculiarly well suited for portraits of children. The next lenses are the No. 1 and 2 of Mr. Burr's Card Lenses. The first is a portrait combination of 1¾ inches diameter, 4½ inches back focus, and about 6 inches equivalent focus, and is furnished with rack and pinion, and central stops. On trying it, we found the chemical and visual foci coincident, and we obtained a very good negative. It gave more depth or diffusion of focus than some photographers would desire, but will suit those who consider this a good quality, seeking rather for pictorial effect than for extremely crisp definition. No. 2 is a portrait combination of a little over 2½ inches diameter, about 6 inches back focus, between 8 and 9 inches equivalent focus, and is fitted with rack and pinion, central stops, &c. It resembles in general qualities the last, but is decidedly more rapid, and gave us a very good card negative, with a short exposure.

Ethnological Photographs.—At the Anthropological

Society's last meeting, some beautiful photographs of British skulls from long barrows at Winterbourne, Stoke, and Gilshead, in the county of Wilts, and from a chambered long barrow at Rodmarton, Gloucestershire, excavated by Dr. Phurnam, F.S.A., were exhibited by him in illustration of a very learned paper on the subject of the crania of various Celtic races.

To Correspondents.

E. Goodfellow suggests that if a list of the prices charged by respectable photographers were inserted in the News, it would enable many provincial photographers, who are anxious to avoid underselling, to maintain fair prices. As a rule we avoid the discussion of details when we have occasion to deal with the commercial aspects of photography, confining ourselves to the consideration of general principles. We notice, however, that as a rule respectable photographers make a charge sufficient to pay, in the first order, for the taking of the negative, and that they do not generally charge less than 1s. each for subsequent copies. As a rule, excellence governs price. Amongst the most successful portraitists in London, some charge a guinea for 6 card pictures; some for 14; some for 20; and do not take a negative for a less order than a guinea's-worth. In other cases—and these are the lowest prices that we know of amongst respectable photographers—the charge is 10s. for 10 cards, and 1s. each for any number after the first order. Good work will always command a reasonably good price, and a good price will remunerate sufficiently well to enable the photographer to take the pains necessary to produce good work. Low prices are ruinous to photography, and tend materially to bring down the status and position of the photographer.

Silver Nitrate.—If you refer to the Chapter in our Year Book again, you will find that chloride of silver must be converted into metallic silver before it can be made into nitrate. Metallic silver is converted into nitrate of silver by placing it in a porcelain vessel containing dilute nitric acid. This will dissolve the silver; the excess of acid must then be evaporated over a water bath. You will find full details of manipulation in our fifth volume. Should you not possess it, we will endeavour to give you a few more details, but the subject is too extensive to treat fully in this column.

J. A. F.—The card is very good, and the ability to produce such will, doubtless, readily secure you an engagement. We are glad that you have derived advantage from our columns. You will find full instructions for tinting in Mr. Wall's book "On Colouring," or in Newman's "Harmonious Colouring applied to Photographs." The colours you name will answer, and the same house has a preparation to make the colours work on albumenized paper.

E. N. Murta, M.D., who, it appears, is the writer of certain letters signed "X. M. D.," writes to say that the omissions, additions, and alterations, to which we alluded on p. 201 of our last, were unintentional, and arose from the copies being made from memory and short notes, and that, under the circumstances, absolute identity was neither practicable nor necessary. In this we agree with him so far as to add our conviction that the whole correspondence was very unnecessary indeed: but when a thing is announced as *the same*, it is not enough that it is *similar:* a person who undertakes to quibble about nice differences between two reports should be careful to make a distinction between "the following letter," and "a letter to the following effect." He desires that some impartial authority should compare the letters to prove their identity of sentiment. To this we have simply to say that the MSS. are quite at the service of any one sufficiently interested in a matter of such trifling importance. He adds also that the insinuation of our correspondent "X" as to the puffing tendencies of "X. M. D."'s letter is false. On this point "X" and others must form their own opinions, the question gives us no concern whatever. We fully agree with him as to the impropriety of giving insertion to "ribald chaffering in a scientific journal," and for that reason, having stated the explanations which he says he has "condescended" to make, we decline inserting his exercitation in offensive epithet, notwithstanding his "demand" that we shall give it publicity. We do this the more readily as we are convinced he can find columns to which scurrilities are more welcome and congenial. We have space only for such matter as we believe will interest or instruct our readers.

B. W.—Cracking in the films of negatives is not always the fault of the varnish: it frequently arises from the fixing salts being imperfectly washed from the negative before drying. If this be the case, and the negative be stored in a damp place, the hygrometric salts are certain to absorb moisture, and injure or destroy the film. So far as our experience and information go, the Soehnée varnish may generally be relied upon, and also most spirit varnishes.

N.—We have not yet tried the developer ourselves, having much press of other engagements. We know the writer to be one of the most experienced and intelligent amateur photographers, and have no doubt at any time of the value of his suggestions. We will forward your letter to him, and hope to have his reply in our next.

R. S.—We cannot speak with much certainty on the subject, and especially on the point of durability for use out of doors. We have seen good work at Nos. 4, 7, and 10, and it is probable you would be well served at these places; but we cannot, we regret to say, speak with certainty.

Amateur.—Your difficulty is not an uncommon one. Intensity of light aids in giving intensity of image, and it is often difficult to obtain with same materials as much intensity with a lens of long focus and small aperture as with a lens of short focus and large aperture. Some persons, in such case, use acetate in the nitrate bath; but, in our own practice, we do not do so. We prefer to use a collodion giving greater intensity. We obtain this quality in two ways, by adding a larger proportion of pyroxyline and diminishing the proportion of bromide. We should also use a weaker developer, with plenty of acetic acid. We have very rarely met with a case in which it was impossible to get sufficient intensity if we used a solution of iodine before intensifying.

J. B.—The print appears a very satisfactory one.

Percontator.—The article on the use of oxy-ethylate of silver was, as was stated, from a foreign journal, and we are not aware that the material is prepared in this country. From the letter of our Paris correspondent, in our last, there appears some doubt about its utility. Dr. Schnauss states it to consist of a mixture of the nitrates of lead and silver, with acetate of lead. Want of contrast may result from many causes. It may be from over-exposure, or it may be from the chemicals being out of order. If you send us an example and more details, we can aid you better. We cannot undertake to say which is the best dark tent. We should prefer No. 6 on your list. For what did you use the solution of iodine in cyanide of potassium?

A. G. Gaant.—It is not incumbent upon photographers to place any announcement or other indication upon a picture to state that it is registered. Pirates always copy at their peril. An unauthorised copy is not the less piracy, morally, whether the original be registered or not, and in making a copy without the permission of the original photographer, a risk is always incurred. 2. It is illegal to state that a picture is registered if it be not so. 3. No copy for any purpose may be taken of a copyright picture without permission of the owner of the copyright. Your other letter shall have our attention in our next.

E. D.—Shall appear in our next.

Vincent.—Tracing linen is used by architects, engineers, and others, and, we conceive, will be sold by stationers; but we will endeavour to ascertain more fully, and let you know in our next.

Permanence.—We should conceive that the gelatine solution may be heated in an ordinary saucepan, or in a jar placed in any pan. It should be filtered through flannel—an ordinary jelly bag will serve, such as your cook will supply. We cannot tell how soon any one will be ready to print for others by the new process. A few months must elapse before the patent comes into operation.

R. J. Buck.—In a new form of trouble it is always wise to send an example. If you had sent a print from one of the negatives, we should have advised with more certainty. We suspect, from your description, that the markings have the appearance of dead silver on the plate, in lines almost like a slug-track. If so, the difficulty is a very troublesome one, which often appears in warm weather. Sometimes it is caused by the horny repellant surface of the collodion causing the solution rapidly to run into marbled or oily-looking lines. In this case a drop or two of distilled water to each ounce of collodion will often remove it. Sometimes it arises from the inner frame contaminating the plate, where the film and free nitrate come into contact with them. Look to these things, and let us know the result.

C. R.—The word *instantaneous* is a misnomer, as applied to collodion. However sensitive a collodion may be, instantaneous results must depend much on light, lens, &c. We believe the collodion you name to be a very good one.

A. Price.—We do not know any one who has given especial attention to the building of glass-houses. 2. Keeping the plate in the bath too long is injurious; the time will vary with circumstances, but, as a rule, not more than three minutes are required. 3. Prints generally lose a little depth in fixing, and should be over-printed accordingly. 4. You will generally find prices in our advertising columns. 5. A solution of gum should not be used for mounting if it be acid. 6. *Humphrey's Journal* can be had by ordering it of any American bookseller. Your own bookseller will be able to effect this. 7. You had better use fresh chalk.

John Hollingworth.—We believe that the cylindrical lenses used by Dagron cannot be had in England. Although they could doubtless be manufactured to order, it would be the cheapest plan to procure them from Paris. We will remember your wish.

H. E.—The stains are caused by irregular development, the developing solution not flowing in an even wave, but running greasily. A little alcohol in the developer will probably prove a remedy.

T. E., Amateur, Newtownards.—Your pictures are brilliant, but you use too much front light, and intensify a little too much, and so make the lights chalky.

W. Beaton.—We will write.

F. S. H.—We have had no reason to doubt the respectability of the dealer you name; but there appears to have been strange neglect. We will cause some inquiry to be made.

J. M. M.—We ascertain that M. Joubert does grant licences for the working of his process of photographic enamelling. We shall probably be able to give you further information shortly.

An article by Mr. Swan on "Transferring Negatives," and several other articles and letters are compelled to stand over until our next.

Several Correspondents in our next.

Photographs Registered during the Past Week.

Mr. John Patrick, 71, High Street, Leven, Fife,
Photograph of Admiral Bethune.
Photograph of J. Anstruther Thomson, Esq.

Mr. William Wilby Law, 49, Gold Street, Northampton,
Two Photographs—Views of Queen Eleanor's Cross, at Northampton.
Photograph—View of the Church of the Holy Sepulchre.

Mr. E. F. Kittoe, The Thames Iron Works, Orchard Yard, Blackwall,
Drawing—Outline for Illumination, "Cross, Crown of Thorns, Monogram, and Photograph of Head of Christ."

Mr. W. H. Warnea, Ross, Herefordshire,
Photograph—"General View of Hereford Cathedral from the North-East."
Photograph—View of the College, Hereford, with the "Juniors."

Mr. Aubrey Paul, I, Thames Place, Putney,
Photogrmph—Album Frontispiece, Wreath of Flowers, &c.
Photograph of William Shakespeare as he appeared before Sir Thomas Lucy on the charge of Deer Stealing.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to Thomas Piper, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 296.—*May* 6, 1864.

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THE NEW CARBON PROCESS.

EXPOSURE AND DEVELOPMENT.

In undertaking any new process it is desirable to minimize to the utmost practicable extent the sources of error and difficulty. The beginner in photography is not recommended to commence by manufacturing his own collodion or albumenized paper. There is unquestionably more pleasure, it is true, in beginning *ab initio* and progressing to a successful result, but this process is often a tedious one, ill suited for persons of little leisure. In undertaking experiments with Mr. Swan's process the student becomes rapidly acquainted with several sources of doubt and difficulty. Samples of gelatine vary in the consistency of the solution, in setting properties, &c., and require slight alterations in the formula and treatment; samples of bichromates vary in solubility; the proportion of colouring matter can be determined by experiment only; the best thickness for the layer of gelatine can only be determined by the same process, as must also the time of exposure, the mode of mounting and developing, &c. If all the rest be perfect, the beauty of the picture may be marred by the opalescence or semi-opacity of an unsuspectedly unsuitable collodion film. These and similar initial difficulties point to the wisdom of busy persons making their first essay with Mr. Swan's own preparations. The sources of error will then be limited within a definite area, and a standard will be acquired for future operations.

We commenced our experiments at a stage which limited the sources of error to exposure, mounting, and developing. A few days ago, Mr. Swan sent us by post four pieces of sensitive tissue of the size of card pictures. These, he informed us, were cut from a sheet of 18 inches square, equally perfect throughout, an apt illustration of the fact that the tissue may be prepared in sheets of almost any reasonable size, so as to be well suited to commercial operations. How long the tissue had been prepared when forwarded to us was not stated, but as it came by post we should imagine that it must have been prepared at least a couple of days, to permit the gelatine to be so completely set as not to adhere to the surfaces in contact with it when packed in a letter. It so happened that our engagements did not permit us to expose it until about forty hours after it was despatched, so that it is probable that about four days had elapsed between the preparation and exposure. We regard this as a point of very great importance, for if the tissue can be prepared for a few days or more in advance without deterioration in sensitiveness or other good properties, a most important point is gained in convenience.

The Exposure.—We were altogether unprepared for the very short exposure necessary. The first piece we exposed was under a card negative of good quality and medium density. For silver printing we should have given it, with the light prevailing,—a weak intermittent sunlight,—about half an hour. With the carbon tissue we gave a quarter of an hour. We examined it by reflected and transmitted light, but did not perceive any visible image, which, if we understood Mr. Swan rightly, should, to the practised eye, have been slightly apparent. We then proceeded to mount and develop it, and found that, although not ruined, it was considerably over-exposed. The next was exposed under a denser negative, in similar light, for ten minutes. This also was over-exposed. The next received five minutes' exposure, and was a little over-exposed. We then tried three minutes and two minutes, the last piece being divided to make two small pictures. These two were the best pictures, the best of all being that which received two minutes' exposure in fair sunshine. The negative was a little more dense than that which received three minutes; but the latter was exposed in a large printing frame with thick greenish glass in front of the negative, and the former in a small printing-frame without glass at all, the negative resting on the rabbet. It is probable that with silver printing the negative which printed in two minutes would have required fifteen or twenty minutes. If this be so, the increased ratio of sensitiveness, as compared with albumenized paper, is very much greater than at first stated by Mr. Swan. Whether our experience simply expresses the normal sensitiveness, or whether this was an unusual sample, or whether keeping had increased its sensitiveness we cannot say; but if the exposure in our hands be a fair test of the degree of sensitiveness usually obtained, we regard this point as possessing an importance which has not before been assigned to it. We may observe also, in confirmation of Mr. Swan's remark as to the latitude permissible in exposure, that, notwithstanding the range of exposure given—from two minutes to fifteen minutes—in no instance was the picture absolutely spoiled beyond redemption.

The Mounting.—Here we met with some difficulty. We are disposed to believe that one of the chief difficulties, or at least a point requiring especial care and skilful management, is the mounting of the tissue before development, for it must be remembered that it must be so mounted that it will bear soaking in water, more or less warm, for about a couple of hours, without becoming detached or forming blisters. The method adopted by Mr. Swan, and which has in his hands given the most successful result, is as follows:—Paper is floated on a solution containing six grains of india-rubber and twenty grains of dammar resin in an ounce of benzole, and then suffered to dry; the tissue is also floated on the same solution, and suffered to dry; the two coated surfaces are then brought into contact, and pressed, when perfect adhesion takes place, somewhat in the same manner which two freshly cut surfaces of india-rubber will adhere. The india-rubber solution intended for our use, being sent by another conveyance, did not arrive until too late; and, as time is required to get perfect solution, an improvised pre-

paration did not answer. In this dilemma we tried an experiment, and used collodion for mounting: coating a plate with thick uniodized collodion, and allowing it to set slightly, we then pressed a piece of thick Rive paper on to to the film to which it adhered, and lifted it from the glass. The tissue was then placed, collodion side downward, on to this collodionized paper, and by a little pressure made to adhere. Had this mode been carried out with more care, and a press used to insure perfect contact and expulsion of air from between the films, we have reason to believe that perfect adhesion would have been secured. As it was, we gained, in place of perfect satisfactory results, some experience. The adhesion was sufficient to bear all the developing and soaking; but some blisters occurred, which marred slightly the appearance of the pictures.

Developing and Washing.—In developing, we commenced by following strictly the instructions of Mr. Swan. We poured hot water into a dish, and when it fell to a temperature of 100° Fah., we immersed the mounted tissue. It had soaked five minutes before we saw any definite appearance of the unaltered gelatine dissolving, and then very slowly, the highest lights appearing first. In subsequent experiments, we found that after allowing the picture to soak a few minutes in water, at that temperature, further operations might be materially facilitated by the use of much hotter water, a temperature of 170° Fah. being applied without injury to any of the pictures we developed. In fact, to simplify operations, we may state that water as hot as the hand can, with any convenience, bear it, may, after the picture has soaked a few minutes, be used, apparently, without any disadvantage. The process of removing all the unaltered gelatine and colouring matter occupies about a quarter of an hour, and soaking in a few changes of water for an hour or two, removes all trace of the chromic salt, which tinges the picture with a greenish-yellow tone, if not removed.

We hope shortly to record some experiences in preparing the tissue, but in the meantime we may refer briefly to some of the difficulties which have been stated to us by experimentalists already engaged. Some correspondents complain of the difficulty of getting one part of bichromate of ammonia dissolved in three parts of water, according to Mr. Swan's formula. One correspondent states that he found that eight parts of water will barely dissolve one of bichromate of ammonia. It is possible that some slight difference in solubility may arise from variations in the samples of the salt itself; but where such a difference as that indicated, exists, we should be tempted to suppose that bichromate of potash had been mistaken for bichromate of ammonia. The latter salt is soluble in from three to four parts of cold water, whilst the former requires ten parts of water. A very fine sample of bichromate of ammonia, manufactured by A. Busch and Co., which we dissolved a few days ago, leaves a small residue when dissolved in three parts of water. We apprehend, however, that if a saturated solution of bichromate of ammonia be used, it will answer every purpose. If bichromate of potash be used, it is clear that a larger quantity of a saturated solution will be required. Another difficulty experienced by some has been the slow drying properties of the bichromated gelatine. This difficulty we submitted to Mr. Swan, who states that he has generally found it ready for use after the lapse of twelve hours, the tissue being kept in a moderately warm temperature. He suggests that the use or an unnecessarily thick film of gelatine will, of course, retard drying, and that if the gelatine be boiled long in its first preparation it materially loses setting properties. One experimentalist found the tissue altogether insoluble in all parts, even in boiling water. Mr. Swan suggests that the boiling water explains the matter. Time, and water at a low temperature will dissolve the bichromated gelatine; but extreme heat renders it insoluble altogether. We shall be glad to learn the experience of others of our readers who have tried this process.

THE REV. WILLIAM LAW'S IRON DEVELOPER.

In a recent number, p. 159 of the present volume of the Photographic News, we published a formula for an iron developer and intensifier, communicated by the Rev. William Law, which, in his hands, had given results superior to other solutions in use. Some slight difficulty has been experienced by two or three of our readers in using it, and we forwarded the letter of one intelligent correspondent, signing "N," to Mr. Law, who has favoured us with the following observations, in order to meet the difficulties which may arise in using the solution in question:—

Sir,—As a simple matter of duty, I hasten, most readily, to comply with your request. The developer alluded to by your correspondent I have used constantly for upwards of a year, and, for portraiture, use no other. For large plates, *i.e.*, for plates exceeding 8 in. by 6 in., I always employ pyrogallic acid, and prepare them by the tannin process. I will first show you how I prepare my developer, *ab initio*, and then describe its action, and offer a suggestion as to the possible cause of your correspondent's failure. Most of the materials I use in photography I prepare myself; for the double salt in question I proceed thus:—

I take a couple of ounces of protosulphate of iron, and one of sulphate of ammonia. The former it is much more convenient to buy; the latter is a very simple preparation, and made by adding, very cautiously, drop by drop, sulphuric acid to *liquer ammoniæ fortiss.*, say 3 or 4 oz., until the compound liquid has *nearly* lost its alkaline reaction. This must now be crystallized to obtain the sulphate of ammonia in a solid form. To accomplish this, I pour the sulphate solution into a large, shallow porcelain washing tray, which, properly levelled, I place on the upper shelf of the oven of any kitchen range, and leave it there until all the fluid portion has evaporated, and a dry, white powder covers the bottom of the tray. This I scrape off with a piece of glass, and add thereto twice its weight of the iron salt; upon this I now pour boiling rain-water, in quantity just sufficient to dissolve it, and again pour the solution into my washing tray, submit it to the action of the oven, and obtain the compound salt in an amorphous crystalline condition, at the bottom of the tray, as before.

And here I must notice one thing which may possibly have *something* to do with the superior action of my developer as compared with your correspondent's. In the condition in which I thus obtain it, it is very different, in two respects, from the double salt procured from the photographic chemist. That has a *regular* crystalline structure, clean, and an uniform colour of pale greenish blue; mine presents the appearance of a brownish dirty green mass of irregular, slightly coherent particles. (Of course, I take care that the heat of the oven is not sufficient to melt the salt, or to change its character by boiling the solution). A second theory, which I note as being very remarkable, is this, that the double salt as procured from the photographic chemist, has very little odour; mine, on the other hand, possesses a very strong and peculiar *saccharine* aroma. With this double salt, I mix the sugar of milk and dissolve the whole in *distilled* water.

The *perfect* solution and filtration is a very long affair. It seems, at first, and even after a couple of filtrations, as if it were an impossibility to get rid of the finer particles held in suspension, but they nevertheless, in time, totally disappear, and after the fourth passage through the filter the liquid is *perfectly* clear and of a pale lemon tint, which is due to the addition of the citric acid. I should have said that I add the acetic and citric acids previous to filtration.

Let me add that I never use filtering paper now for any purpose whatever, except it be a very rough one indeed.

I always roll up a tuft of cotton wool, and press it with slight force into the neck of the funnel, and then (which is a very important matter) draw a little distilled water through it by suction.

I use a silver bath of the capacity of 36 ounces with 40 grains of nitrate to the ounce, and slightly acidified with nitric acid, the silver fused and re-crystallized. I cannot see the reason of the "violence of the action of which your correspondent complains," for with me the developer is under perfect control. The picture does not "start out," as with some developers, and momentarily exhaust the reducing energy, but darkens *gradually*, and, in a general way, *sufficiently*, with one application.

I cannot undertake to prove to the satisfaction of your correspondent, or of any others of your readers, that my developer is "the best." All that I can affirm is that it satisfies me, and that I now, for portrait work, employ it exclusively. My simple object in communicating it to your journal was to afford to others the advantages which my experiment had afforded to myself. If I can be of any, even the slightest, assistance to your correspondent, you are at perfect liberty to send him my address, and if any fresh queries should suggest themselves to his mind, I will gladly reply to them.

But further, I propose, D. V., being in town before the expiration of the present month, and I will bring with me some of the negatives produced by this identical developer for your own and your correspondent's examination, and some of the developer itself for your use. Possibly your correspondent has not added sufficient acid to his developer. The acetic, which I employ, is solid at 60° Fah. I have written very hurriedly, but hope I have made myself understood.—I remain, dear sir, yours very faithfully, WILLIAM LAW.

Marston Rectory, May 3, 1864.

TRANSFERRING NEGATIVES.

BY JOSEPH W. SWAN.

I OBSERVE in the last number of the PHOTOGRAPHIC NEWS, a letter signed "Phosphorus," asking information as to my mode of transferring negatives. For his benefit and that of others of your readers, I will briefly detail the mode of proceeding.

The negative is taken in the usual manner, and after the collodion film is dry, I warm the plate to 80° or 100° Fah. I then place it in a horizontal position, collodion face up, and pour on the following solution at about the same temperature as the plate.

Gelatine	1 ounce
Water	4 ounces
Glycerine	½ drachm.

The quantity applied may be varied according to circumstances, but, generally, I find about one ounce of the gelatine solution enough for the 8½ by 6½ inch plate.

The proper quantity having been poured on the centre of the plate, I incline it from side to side, so as to cause the liquid to flow over the entire surface, and I assist the flowing by a glass rod, using it as in coating sensitive paper, and being careful to avoid the formation of air bubbles.

When the entire surface of the negative is coated, the plate, if placed perfectly horizontal, may be allowed to rest until the gelatine solution "sets." If, however, the plate is not strictly level, it is admissible to keep turning it slowly during the few minutes that elapse between the coating and setting.

After the gelatine is set, the plate may be placed in a box or drawer or closet, out of the way of dust, and where the gelatine coating will become dry, say, in the course of 24 hours. After this, I varnish the gelatine surface with lac varnish (vernis Sœhnee, for example), the coating of varnish being applied in the usual manner. When the varnish is dry, I make an incision, with the point of a knife, round the plate, cutting through the coating to the glass, at about a quarter of an inch from the margin. I then raise one corner of the sheet and carefully lift it all off.

There are a few precautions to be observed to prevent miscarriage :—

1st. The collodion with which the negative is made, should have a good strong body. It is not quite safe to attempt the transfer of a negative made with collodion which produces a weak and porous film.

2nd. The gelatine should be clarified with albumen, and strained through flannel, wrung out of warm water just before using; and the straining should be so managed as to prevent the formation of air bubbles.

3rd. If heat be used after the application of the varnish it should be very moderate, and not continued so long as to produce a brittle dryness of the gelatine.

The glycerine is introduced to guard against this, otherwise, it is not necessary. I have not quite determined the best proportion of glycerine, but I know that the quantity named in the formula here given answers the purpose.

The collodion surface of the negative is, of course, the proper one for placing in contact with the printing surface. The surface of collodion is surprisingly hard, and I think will bear a good deal of wear without abrasion in the act of printing from it; but in the case of any negative from which a very extensive series of impressions might be required, it would, I think, be well to varnish both surfaces; this might be done very easily by the immersion of the negative in the varnish.

If the transferred negative were used for silver printing the gelatine side of the negative would have to be placed in contact with the sensitive paper, in order to avoid the reversal of the image, and this is attended with the loss of detail, more or less, according to the thickness of the gelatine film, which, in this case, intervenes between the sensitive paper and the negative image, residing in the film of collodion.

In proposing the transfer of negatives, I had more particularly in view their application to my process of carbon printing, where the collodion surface of the negative would come into contact with the sensitive tissue, and so the most perfect detail would be secured.

There is another letter in a recent number to which, if you will allow me, I will now briefly refer, it is that of Mr. Beatty. I have read the letter to which Mr. Beatty directs attention, in No. 431 of the NEWS. Mr. Beatty certainly proposes, in that letter, the use of collodion and gelatine; but I think, for a purpose and in a manner very different from mine. If I understand Mr. Beatty aright, the object he had in view in proposing the use of collodion as a coating for the sheet gelatine, was *the making its surface waterproof*, thereby rendering it more useful *as a glazing for prints and photographs*. In the printing-ink process, which Mr. Beatty describes, the collodion performs no other use than that. In the process which I have published, the collodion film performs a very different and much more important function.

There is also as wide a difference between the uses to which we each put the gelatine. In Mr. Beatty's process it performs simply a mechanical part, its surface acting as the support from the sensitive printing ink; while in mine, the gelatine plays a chemical as well as a mechanical part, and is itself the substance forming the picture. In Mr. Beatty's process, the negative is separated from the sensitive surface by the whole thickness of the gelatine, and the light has to pass through this before reaching it, of course, not without some loss of definition. In mine, the negative comes closely into contact with the sensitive material, the extremely thin film of collodion only being between them. I thereby obtain detail of microscopic fineness.

I certainly think that the differences between Mr. Beatty's mode of using collodion and gelatine and mine (there are others besides those I have named) are very wide indeed, and that the one cannot well interfere with the other.

I feel obliged to Mr. Beatty for the kind manner in which he has brought the matter forward.

Newcastle, April 26th, 1864.

ON THE PORTRAITURE OF CHILDREN.

ONE of the most difficult and patience-trying tasks that falls to the lot of the photographer, is, undoubtedly, the portraiture of children, and of infants in particular. Many, I have no doubt, will join with me in this opinion, and call to mind with more vividness than delight, that eternal hush, hush, of the nurse, in futile attempts to reduce the refractory juvenile to a happy condition, or suppress an unlimited exuberance of spirits, both alike photographically objectionable, as your fast-emptying plate-box and failing patience testify. How to do it, has been a vexed question ever since the introduction of the art, and in all probability

will continue so until the end. It remains, therefore, for us to reduce the disagreeables to the least possible quantity, and my object in venturing to fill up space in your valuable journal, is to describe a few of the ways and means, I have found in my practice, most conducive to this desirable end.

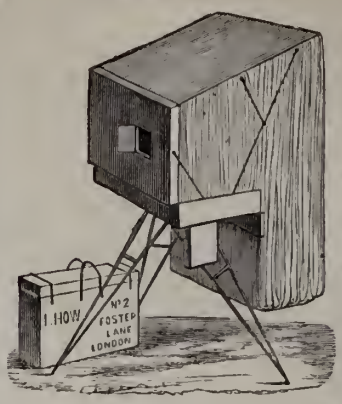
Let us suppose a case of mother and child: the youngster rising two, and very lively—nine times out of ten the results of our manipulation will be, features undistinguishable, and a monstrous development of arms and legs; or providing by some extraordinary freak of nature it remains quiet, we have the mother with either objectionable pose, or disagreeable expression, consequent on the anxiety of keeping the child quiet. The following method I have found most successful in dealing with the difficulty. On the arrival of the sitters in the studio, place them at once nearly as possible in the proper focus, arrange the accessories and light, and decide in your own mind how you will have them posed at the critical moment, but do not attempt to place them in the position you wish them to remain, until you are quite prepared to expose the plate; but after the general adjustment, leave them to themselves, during the time you make the requisite preparations; when complete, quickly and finally adjust the sitters, according to your already preconceived ideas, attract the attention of the child by waving about some showy toy or other it has not been allowed to see previously, the motion will then excite a certain amount of inquisitiveness, and consequent forgetfulness of bodily action, the conditions you require. Now is the time, uncover the lens, and the probability is, the child will not have moved, and a satisfactory picture is obtained. For my own part, I consider a better result will be gained, if the operator carefully watches his model during exposure of the plate, as, in case of a slight movement, the lens can be covered at once, a slightly under-exposed picture is better than a blurred one fully exposed.

In photographing children of more advanced years, after arranging the accessories and light, give the child a book or toy, most appropriate to the subject, with a few plain and *pleasant* explanations how you desire it placed, retire as before, to allow it to pose itself of its own free will, which will usually be in an easy and unconstrained attitude, characteristic of the child, and requiring but little alteration to fit it for your purpose; this must be done without hurry, but expeditiously. Nothing tends to frustrate your object more than a *long time* spent in moulding your model to your fancy. Do not use a head rest, it generally causes a stiff and formal pose, and rarely with children answers the purpose for which it is intended, therefore dispense with it if possible. Much, however, depends on the tact of the operator, and in his power of interesting the child in himself much of his success depends. If we inquire into the origin of successful portraits of children, we invariably find the operator well endowed with those inestimable qualities, denominated perception and tact, the full exercise of which this department of photography requires more than all others. In the foregoing, the writer merely details methods of proceeding he has found most successful in attaining the desired end; and which, probably, more eminent photographers have long used, with modifications and improvements; still, as there are numbers who regard this department with abhorrence, and deem it scarcely worthy of their time and trouble, by adopting these methods, either wholly or in part, they may render tolerably pleasant what would otherwise be a great bore. E. D.

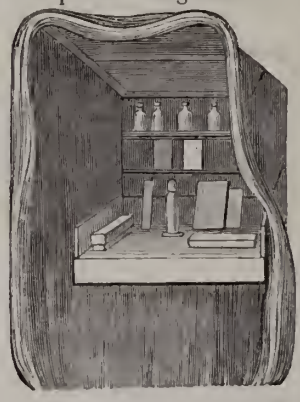
HOW'S DARK TENT.

Mr. How has recently called our attention to a tent he has contrived for field work, and as the season approaches for out-of-doors operations, a brief notice may interest our readers. The engravings show the tent packed up, and the interior and exterior when opened for use.

It will be seen that it is a combination of the tent and developing box, the aim being to secure the utmost efficiency and convenience with the least bulk and weight.



The entire tent, when packed, occupies the small space of 2 feet in width by 18 inches in depth, by 6 inches in thickness, and weighs only 20 lbs.; not being as large or as heavy as a well-filled carpet bag, whilst it is more compact and convenient for carriage. Perhaps its distinguishing feature is the readiness with which it can be set up for use, or repacked; in this especial point exceeding in convenience any other we have seen. The lid of the box, as may be seen in the engraving, forms the front of the tent, whilst the other portion forms the table. A forked iron rod fitting into the bottom part of the box supports a light iron frame, which is hinged to fold up when the box is packed, and forms the slanting roof when the tent is erected. The two forked iron rods are the only loose pieces, every other portion being attached.



The second diagram shows the interior, which is very conveniently arranged, and has a folding shelf, which permits the various articles in use to be kept out of the way of splashes, &c. In front is a sliding window, admitting yellow light when closed, and a free current of air when opened (thus securing the ventilation so necessary, but so often neglected in dark tents).

The covering consists of yellow calico lining, brown twill covering, and two thicknesses of black calico between. The woodwork is of good quality, and well made. Altogether, the tent comprises facilities for working plates up to 12 by 10, with more conveniences and fewer disadvantages than any other we know. We have often expressed an opinion in favour of developing boxes, in which the head is at liberty, instead of being enveloped in the tent—of this class, Blanchard's Developing Box, with its recent improvements, is the best we know, and for small plates all-sufficient, but for larger plates nothing can exceed the conveniences of Mr. How's new tent.

RESEARCHES ON POSITIVE PRINTING.*

BY MM. DAVANNE AND GIRARD.

Chapter VII.

On the Fading and Revival of Paper Positives.

In the preceding chapter we have carefully studied the practical conditions of toning, and explained the nature of the baths which we considered to be preferable; but before concluding this study, we have sought to discover what degree of resistance to fading the various toning processes proposed hitherto can give to the proof. In order to examine this fact, we have taken proofs prepared by the most varied processes, both by ourselves and by other experimenters, and we have placed these proofs, all together, in proximity with natural emanations of sulphuretted

* Continued from p. 209.

hydrogen, and in such a position that moisture, and even rain, could at the same time exercise their action upon the argentic compounds of the pictures. To these proofs taken from among the ordinary productions of photography, we added a fragment of a proof revived by a long immersion in a solution of chloride of gold. It was well that we undertook to make this condition, for, without it, the result obtained would have been deplorable for the future of photography: at the end of a few months all the proofs had faded, not one had retained its original colour. But it was not so with the revived proof: its colour, due to a considerable deposit of gold, with which it was covered, had not undergone the slightest alteration. On the other hand, in observing the gradual alteration in the accompanying positive proofs, we very distinctly recognized that the passing of these proofs to a yellow hue was much more rapid in proportion to the lightness of the toning, that is to say, in proportion to the diminished quantity of gold.

These experiments prove that the positive proofs resist change much better when they are strongly toned, and that if the quantity of gold which the baths have deposited is considerable, there is nothing to be feared from the natural emanations of moist sulphuretted hydrogen.

Thus, then, of the three causes of fading, which we have noticed above, the first no longer exists, the second may be easily avoided, and the third is of no importance if the photographic proof be strongly toned. Let us then say most emphatically that, *a proof well washed and strongly toned, does not fade; fading is not the normal fate of proofs; it is an accidental result which it is always easy to avoid.*

The experiments we have described possess, therefore, great practical importance; and not less so in a theoretical point of view; they show, in fact, that, in the act of fading, it is upon the silver alone, and not upon the gold, that the sulphur compounds exercise their action.

Here the difficulty reappears, which we undertook to resolve in 1855. If the fading is due to the action of sulphur compounds upon silver, how explain that the faded proofs become yellow, when, as is well known, sulphide of silver is violet black? It is only recently that we found the solution of this problem. It consists entirely in the influence upon the sulphide of silver of the organic matters which play in the different phases of the production of positive proofs so important a part. For, the sulphide of silver prepared by the decomposition of a simple salt of silver in no respect resembles that produced by effecting the same decomposition in presence of the organic matters usually employed in sizing the papers. When we take a solution of nitrate of silver and pass into it a current of sulphuretted hydrogen, we obtain the ordinary violet-black precipitate of sulphide of silver; but when we add starch, gelatine, or albumen to this solution of nitrate of silver, the product formed will be a kind of *lake* due to the combination of the organic matter with the sulphide of silver, and this lake, slightly soluble, will have just that yellow hue which characterizes faded proofs.

When, then, the metallic silver with which a proof is covered is submitted to the action of sulphur compounds, there is formed first violet-black sulphide of silver and a real toning is produced; but gradually water intervenes, penetrates the sizing, and swells it, combination takes place between the sulphide of silver and the organic matter, and the sulphide of silver lake substitutes its yellow colour for the black hue of the sulphide.

Such are the successive phenomena which are accomplished on the surface of the proof if it has been toned in sulphuring baths, if incomplete washings have left it impregnated with hyposulphite of soda; and lastly, if it be found placed, after insufficient toning, amidst unusually abundant hydrosulphuric emanations.

Revivification.—The question of reviving proofs had, when we first occupied ourselves with it in 1855, a very great importance; at the present day, this importance has much diminished. For we have established the fact that fading is an abnormal fact due to the imperfect preparations which almost every operator knows how to avoid now-a-days, and, consequently, the restoration of faded proofs possesses only a secondary interest.

We will briefly describe this operation. It is the submitting the proof to a fresh toning. Placed in a gold solution, the faded proof colours and tones like a proof recently prepared, but slower. It thus recovers a part of the vigour it had lost; still, we should deceive ourselves if we expected to restore in this manner all its primitive vigour. Thus, as has been stated above, the lake of sulphide of silver and organic matter is slightly soluble, and, consequently, the finest half-tones have, after passing to the yellow state, been carried away by the action of the water, these half-tones disappear, evidently the revivification cannot restore them. Moreover, it is only in faded proofs that the light tones are tinged yellow, doubtless in consequence of a change in the albumen which coats the paper, perhaps by the sojourn in these parts of argentic compounds which imperfect washings have not removed; in the reviving bath this yellow tint does not disappear; on the contrary, it becomes stronger, and if, to cause it to disappear, we submit it to the action of chlorine water or of chloride of lime, these compounds act at the same time upon the thin metallic portions of the picture and destroy the half-tones.

Whatever it may be, revivification by salts of gold furnishes, nevertheless, under ordinary circumstances, very satisfactory results; it causes the yellow tone of the faded positives to disappear, substituting the violet or black colour of ordinary proofs, and especially prevents all subsequent change, by replacing the eminently sulphurable surface of silver by a surface of gold, which possesses an almost absolute resistance.

The best manner of conducting an operation of revivification is the following:—The proof is detached from the support upon which it has been pasted, immersed in water until it has become thoroughly impregnated with it, then left for four or five hours in a quite neutral solution, recently prepared, of double chloride of gold and potassium, the strength of the solution may vary between two and five-thousandths, the stronger it is the quicker it acts. When the restoration appears complete, wash the proof in ordinary water; the washings, as well as the immersion in the gold bath, must be performed in the dark room. The washed proof is afterwards passed through hyposulphite of soda, to remove the chloride of silver formed by double decomposition, and then washed in water as usual.

(To be continued.)

CHEAP CONTRIVANCES IN CONNECTION WITH PHOTOGRAPHY.

BY JOHN BOCKETT.*

In bringing before the last meeting the small medallion camera, I had not intended committing myself to the production of a paper to be read upon the present occasion; and can only say that if the hints that I may now throw out should benefit any of my fellow members, I shall be but too glad in having suggested them. It is now some years since first I began the practice of photography, and I found that to run to the opticians and other traders involved a very serious drain upon my pocket, finding very often that my new dodge was worthless, though I had had to pay for my experiment. I am aware that among our members we have some of the highest class amongst the optical and other manufacturing branches in connection with our pursuit, and I should most certainly not consider it right were I in this paper in any way to say or do that which would hurt or invade their interests.

As regards the present subject, I will simply call it *cheap contrivances in connection with photography;* and, as the word "cheapness" looms largely therein, I would humbly disabuse the mind of any one who might fancy that by

* Read before the North London Photographic Association, April 20th.

cheapness I mean articles simply at a low price. As to the best means of going to work upon as low a scale as possible, I trust this evening to show you how I have acted, and, if anything is gleaned therefrom, I shall, as I said before, be content.

In my first attempts I thought it advisible to ascertain what was the current price of all apparatus in connection with photography, as this could only be done by obtaining the various makers' catalogues; I believe in the book before you is a portion from those of nearly every maker in London, and I can only say that I esteem that book as one of the most valuable I have in my library. Some of the names therein are now no longer in existence.

After due consideration, I started with a good French lens (mind, not a cheap one). It was a half-plate one, and cost, I think, somewhere about 30s. The camera was constructed of mahogany for stereoscopic plates, and, with two backs, cost 50s. So far, not much for cheapness; but afterwards, it became necessary to add to the backs, and also to find a case to carry them in; and it was when I began to think how to utilise what I had, that my wits were sharpened, and I began to find out the work I wanted done. If an amateur desires any portion of apparatus not ordinarily kept in stock, and wishes to have it efficiently made, I would strenuously advocate the making a drawing of the article required before going to the artificer. I work with various lenses—some French, some English—by good makers of both countries, and do not find such alarming differences in their work, as compared with their prices. Upon this subject, I hope to hear the views of other gentlemen during the evening.

To revert to the original lens and camera. It occurred to me that I should like to try something in the dry-plate way, and also that the same box should be subservient to the wet process. I therefore had the box on the table constructed. You will see that it takes six stereoscopic slides for dry, or two backs and a box for holding clean plates for the wet process. The cost, therefore, stands as follows:

	£	s.	d.
Camera and lens	4	0	0
Mahogany box and screw, with tripod in glass	1	5	0
Four extra backs	1	0	0
One box for glass plates	0	5	0
Focussing glass	0	2	6
View meter (although I never found it of any good)	0	1	6
	£6	14	0

It then involved another box for chemicals, &c. This I drew out and the apparatus is now on the table. The cost of that box covered with leather was under £1. The bottles for developing and fixing solutions cost a few pence, and the gutta-percha bottle 4s. There is room for cloths, collodion bottle, bath, &c. &c., and I am certain that without a drawing I should have had to pay two or three times the amount. Allow me to direct your attention to a box for holding the negatives when wet. It is made to open both at the bottom and the top and in the bottom, which is varnished, blotting-paper is inserted to absorb the moisture. This box was also included in the former sum.

I must now in effect kindly ask you, in imagination, to step into my substitute for a glass house and dark room; there is no need for my repeating the description of the former, as the full details appeared in vol. vii., No. 222, of the Photographic News of July 3rd, 1863, to which I refer any one who may wish to make one like it. I can only say that I find it admirable, and think, with the experience gained in the erection of the one now in use, I could even build a better for less money.

Now in a glass house the first requisite (after the light is duly moderated, for which purpose the commonest glazed calico appears to me to answer best) is another article that for this purpose can be obtained cheaply, namely, a background; and the cheapest way to go to work upon this I found was to buy three battens twelve feet long by three inches wide and one inch thick, which I sawed half through at each corner, and then glued and screwed together, stretching the sheeting tightly all round. I then wet it thoroughly and got the lead-coloured paint over it as soon as possible, working it evenly all over. The paint should have but little oil, the menstruum being chiefly turpentine. If this be done quickly it will, with the water already in the sheeting, dry dull and without any glaze. A better plan of making a background is to have two frames of equal size, with wooden screws in the underneath one, and, after the sheeting is tacked over the upper on to the underneath one, as in the model before you, should the surface get slack, a turn or two of the screws will bring it all taut again.

A word on pedestals. If amateurs would only have some of the rough work done (their time being much engaged otherwise than by photography) many pounds might be saved. A packing-case of half-inch stuff, three feet two inches high by fifteen inches on each side, can, with very little trouble and a few brads, be converted into a capital pedestal. The heading and moulding for the top and sides can readily be obtained for a few shillings, and, in consequence, for less than half a sovereign a capital strong article can be turned out. If necessary, the bottom can be covered in, and a side made to open upon hinges, so that the curtain or any other little etcetera, may be stowed away when not required. The price for this, I see, is set down at 42s.

Again, as to the dado, the price of which I lately saw quoted at 42s., nothing can be better than some more moulding for the top and sides, and canvas stretched over a frame, which, with some common oak paper and bordering, can be completed as a whole, for three or four shillings at the utmost.

Then, as to inner etceteras, such as curtains, vases, tables, chairs, inkstands, carpeting, &c., the article I find answer for curtains—still keeping cheapness in view—is green baize of the commonest and lightest description. Vases of all descriptions are obtainable at any price of the Italians who carry them round; and fancy tables, not varnished, but very tastefully finished articles, can be obtained at 119½, Great College Street, Camden Town, of a maker named Keene, at the price of a few shillings. If fancy chairs must be used, Bower's chair works, Vauxhall Bridge, Surrey side, is the place where any one can be suited: but a good mahogany chair, which is already in most houses, appears generally preferable. With respect to carpeting, the various small patterns that are to be had made in felt, appear to me to supply all that can be desired. With regard to head-rests, I have had no experience, having only one, and seldom finding that I liked the pictures when it had been used I discarded it, and trust rather to my lens and light.

As a cheap contrivance for transparencies, and also for enlarging to a certain extent, say two diameters, I have again had recourse to the packing-case maker. A case is made which will just take a camera, and the negative from which a transparency may be required is inserted in a carrier which also just fits the case, and can be slid nearer to or farther from the lens. This arrangement can be very nearly fitted up for about 4s.

Respecting an economical plan for drying prints, an idea suggested to me some time past by Mr. Simpson appears certainly the best. It consists in passing some black pins through slices of cork, and then gluing them three inches apart upon a lath. The prints are then simply stuck through at the corners, and left to dry, With regard to camera legs, I lean towards the cheap French ball-and-socket kind.

As to rolling machines: I cannot say a word in the way of cheapness here, as really the rolling machines to do stereoscopic and *carte* work must be better than what I now see turned out at comparatively next to nothing. I know of no better maker of this article than Austin, of Lambeth—a small machine as above being obtainable for a trifle under £3. I have used one for two years, and it is still perfect.

Two other articles, viz., balustrades and printing-frames,

still remain to be noticed. The former can be made very reasonably, if those requiring them will get a joiner to glue two pieces of deal together, with two thicknesses of brown paper between them, and then to turn the pillar. These can be got simply for 2s. 6d. each, and three, of course will make six pillars, which, with the addition of a batten or two and some moulding, will complete the affair. As regards printing-frames, perhaps the cheapest and best are those on the table, made by Wyld, of Irwin Street, Leeds.

A simple means of testing whether the chemical and visual foci of a lens coincide is on the table, consisting of a slip of wood with a wire foot, the wood divided into niches, and cut slantingly. In each notch is inserted a card with a large printed letter upon it. The centre is focussed for, and if it come out sharpest of all the lens is correct; if not, it shows whether the one focus is before or behind the other, according as the letter is brought out.

Lastly: I would bring under your notice the German show mounts obtainable at 2d. an opening, and with the moulding for picture frames at about 7½d. the length. I think nearly every amateur would, if this were known, make his own frames, which certainly would not cost more for 12 by 10 than about a couple of shillings. The pictures before you were taken in the glass house referred to, and contain the pedestal, table, &c.

I fear my paper may contain but stale news to many here present; but as I believe I am but the type of many of my fellow workers, I consider that if every one would but make open confession of his doings in this our favourite pursuit, some novelty might crop up at our meetings. I have as much as possible in the foregoing avoided any names of firms, but should any member present desire my aid in helping him to obtain an efficient as well as a cheap addition to his stock, I shall be most happy to place my experience at his service.

PHOTOGRAPHING THE EYES OF MURDERED PERSONS.

The latest development in this delusion has taken place in San Francisco, Cal., where, a woman having been murdered, a photograph was taken of her eye with the result set forth below. The account is taken from a letter written to the *Bulletin* by an individual who seems to have more fondness for sensation paragraphs and sentences than naked facts; and he "romances" in such a style as to make us rather sceptical whether his account be not wholly imagination, though he avers in his letter that he is not at all given to flights of fancy. Here is his statement:—

"The experiment of photographing the retina of the murdered woman's eye, despite the persiflage and incredulity with which it has been in most quarters received, has either developed a remarkable coincidence or produced a wonderful result. Stamped upon the centre of the retina, and conveyed by the photographic process to the plate upon which the picture was taken, there is plainly to be seen the outline of a human figure, so plainly as at once to arrest the attention of the most unimaginative eye. The figure is that of a tall dark man, the lower part of the face muffled in a heavy black moustache and beard, the left arm extended, and the whole body thrown into the position of a man doing some violent deed. The face has enough of outline to suggest the possibility of filling it up so as to recognize the man were he met in a crowded street. The bushy hair surmounting a low forehead, heavy eyebrows arching over the cavernous depths where the eyes lie, the shadowy suggestions of the whole face, which cannot be described, but which impress the observer with a strange weird horror, causing one to start back as though with profane hand he had rent the veil and caught a glimpse of that world that lies beyond the confines of the grave. It is idle to laugh at such things. A fool can deny everything, but it is only a wise man who can seriously make up his mind to believe anything.

"The writer is not at all an imaginative man (?) and took no stock in the unauthenticated accounts of marvellous successes, which had attended similar experiments in France. Physiology and philosophy both seemed to laugh at such a theory, and the writer was prepared to treat the thing lightly. But seeing is believing; plainly from the photographic plate the figure of a man looks out, the last object the murdered woman saw on earth, as when she turned her piteous eyes to heaven for help, and saw only the cruel face of the murderer bending over her, while his remorseless hand held the sharp knife quivering to her throat.

"To suppose that the photographic figure to which we refer is the result of an accidental grouping of shadows, is simply to seek a miraculous explanation for a very simple natural fact. For it is much easier to suppose that the outline of the murderer was caught on the sensitive retina than to believe that in the only instance in which the experiment has been attempted in this country, a combination of light and shade should have occurred to produce a shape so exactly like a human figure as to deceive many sensible and unimpressionable men. In any event, the experiment is worthy of further trial, and demonstration is easy. Oxen are killed daily. Experiments by photographing their eyes would soon determine whether there is anything in this theory or not.

"Whether or not, granting that the experiment proves successful, it will ever prove of any actual use, is a matter of question. For, once establish this fact, and murderers will punch out their victims' eyes before leaving them. And the dead retina might in some instances mislead the living judges. For supposing that a man were talking to and facing you, and that another, suddenly coming up behind, dealt a blow which finished him. Your image would be the one impressed upon his retina, and an innocent man might hang were the eye taken as conclusive evidence. The coroner in this case mentioned to the jury that he had had a photograph made of the retina of the eyes of the murdered woman. It was imperfect, and showed nothing. He did not have any faith in the thing, but for curiosity's sake, he would have another ambrotype taken immediately."—*Scientific American.*

ON THE PRINCIPLE OF IMITATION AS APPLIED TO THE DECORATIVE ARTS.*

I now proceed to lay down and illustrate the last division of my subject—the conditions which ought to regulate the employment of surface coatings. These are—

1. That they be not employed to imitate a material where the original itself would be out of place.

2. That no object be painted or otherwise made to imitate one material which, from its form, construction, or application, is obviously or necessarily composed of another.

3. That no inferior surface coating be employed where we should expect one more expensive, and no imitation where we are entitled to find the real material, or where the discovery of an imitation would create disappointment.

Everyone may supply himself with illustrations. For example; as to the first condition. Imitation marble should never be used on such positions as ceilings, where the construction is obviously a wooden one; nor on shop-fronts in crowded thoroughfares, where the real material would be destroyed as soon as exposed, and where it would therefore be out of place.

In illustration of the second condition, we may mention that elaborate delicate carvings should not be painted to represent granite, nor iron columns like wood or marble where these materials are unfit for the duty in the way of support or otherwise, which the iron has to perform.

In regard to the third condition. We have said that decorative appliances are valued for three qualities—their beauty, durability, and expression of cost. We may assume that the rank or wealth of the person who owns a work of art, or who makes use of a decorative appliance, will not alter our estimation of its value or fitness, so far as these are imparted by the two first-named qualities, beauty and durability. Our ideas on these points may be said to be absolute, except in so far as they are liable to be changed with regard to beauty by the influence of fashion.

But the third quality we have named is to be considered in a different light. The fitness or unfitness of a work of art or of a decorative appliance, considered with reference to expression of cost, falls to be determined by the rank, wealth, and social position of the person who owns or makes use of it.

The question involved, then, in the discussion of the third

* Continued from page 211.

condition, under which we assert that imitative appliances may be used, is, perhaps, in this view, not strictly æsthetical. We shall give one or two illustrations of our principle.

If we should find in the cottage of an agricultural labourer a figure, say of the "Dying Gladiator," we should receive it as an evidence of great taste, although the statuette should prove to be of zinc electro-plated with bronze. Such an object would be out of place in the possession of a rich collector; but, if I mistake not, few connoisseurs even would be sufficiently purist in their tastes to object to the same figure in bronze plated with oxydised silver. If I might venture to express an individual opinion, I should say there is no more beautiful appliance in use at the present day for coating bronzes. Probably even a zinc brouze-electro-plated figure, if large and applied to a useful purpose, such as holding a light, might be found unobjectionable in a similar situation. In a nobleman's mansion, or even in a royal palace, our feelings would not be shocked if we were told that the gold dinner service we were admiring was not solid gold, but silver gilt, while we should feel it to be the essence of meanness if the noble or royal possessor had resorted to the cheap expedient of having dishes only plated on nickel instead of genuine silver. One admires the beauty of the colossal statues which adorn the throne room in the Residenz of Munich, without regarding the material of which they are composed. No doubt our respect for them would be much enhanced, whatever we might think of the wisdom of the monarch who had them cast, if we were made aware that they were solid masses of gold. But as no one probably ever indulged in this belief, so nobody was ever disappointed when told that the substance is bronze, and the gold which meets the eye a superficial coating merely. Perhaps the mind may be better prepared for the gilding of bronze by the knowledge of the fact that its colour is but a lacquer, the bronze itself but a hollow sham, a pretender to solidity, representing bones, flesh, and skin; when it is skin *et pratærea nihil*. If the idea of a figure being mere skin and bone exposes it to contempt, what is to be said of one which is skin only without even the bones.

I have thought it necessary to direct attention pointedly to this custom of coating a common cheap metal with metal more attractive, as well as more expensive in the view of ascertaining whether it is a practice which can be indulged in with propriety, and on what principle; because it is not merely an important branch of the general question we are considering, but because it involves important material interests and has been treated at considerable length by various modern writers on art who are recognised as authorities, and who have arrived at what seems to me to be false conclusions on the subject.

The third condition which I would impose on the use of deceptive coatings, and which I will now repeat, seems entirely to meet the case. That no inferior coating be applied to a surface where we should expect one more expensive, and no imitation where we are entitled to find the real material, or where the discovery of an imitation would create disappointment.

This mode of viewing the subjects brings us back to the question which we have already so far discussed—of worthiness or unworthiness, of propriety or impropriety.

We have a right to expect that every one will support with dignity the rank and position which God has assigned him in the world. No man can do this who resorts to shabby and cheap expedients in his ordinary business even, much more in matters of taste and ornamentation. But shabbiness and cheapness are relative terms. We do not expect our bourgeoisie to veneer their walls with real marbles, although we have all seen such finishings. In king's houses in all parts of Europe they exist. The interiors as well as the exteriors of the old Venetian palaces were so decorated. In the residences of many even of the smaller German potentates, and in the mansions of the wealthier of our own citizens, a few examples are to be found. One has therefore a right to expect our own royal residences and public monuments to be decorated with the noblest materials. One could scarcely be reconciled to the idea of having the noblest apartments in the palaces of the Queen of England decorated with painted imitations of rich materials. Our opponents may condemn such incongruities wherever they are found, and in any reasonable terms they choose, for there is no doubt in such positions they would be worthy of all condemnation. If costly materials and costly works of art are to be found anywhere, surely it ought to be in the palaces of that monarch on whose dominions the sun never sets. Genuine gooseberry and mock turtle at a lord mayor's feast would seem absolutely virtuous by the comparison.

Even these rules, however, will not admit of too rigid application. In many instances the work, from want of previous arrangement, is put into the hands of the decorator in a state which leaves him little choice in the matter. Besides, the use of such decorative appliances as a painted imitation of marble frequently affords the means of introducing a mass of rich broken colour in situations where a flat uniform tint would be ruinous to a composition. Of these means even Raphael did not scruple to avail himself in the decorations of the Loggia. The use of such appliances may therefore be occasionally justifiable, where too rigid on application of our rule would exclude their use.

In fact, we cannot, in all matters of taste, establish such unchangeable canons as those which settle the principles of morality. In matters of taste there are many things essential, and there are many things of little moment. Within the region of æsthetics there is a vast debateable land where individual preferences have free scope for exercise. Within this region it is impossible to ignore or set aside the influence of fashion, whose code, for the time being, is as inexorable as the laws of the Medes, though, unlike those laws, it is ever inconsistent and ever changing.

In matters of personal adornment deceptive expedients have always been less or more in vogue. The Greek ladies, jealous, it may be presumed, of the beauty which they discovered in the low foreheads of certain of the inferior animals, and anxious to rival it in their own persons, invented a species of wig to conceal the upper part of the forehead, and bring the hair as near as possible down to the eyes. The faces of the Roman ladies, having been properly softened and prepared by means of a bread poultice plastered over their features at bed time, were daily, after it was washed off with asses' milk, brought by means of paint to rival the hues of the lily and the rose. In these days of ours we complacently accept the improvement in our personal appearance effected by the operations of the deutist, and do not grumble at their deceptive tendency. Perhaps their manifest usefulness may in some degree leaven the vanity which frequently induces the patient to submit himself to the operator. In the style of dressing her hair, although woman has found out many inventions since the time of the Greeks, still must her flowing locks be rendered fuller and more flowing by foreign aid. Fiction has still to be added to fact that she may realise her ideal, though that is not the ideal of 2,000 years ago.

We are not so tolerant of paint. It is not easy to define that principle which admits of one lady making herself more charming by adding pounds of hair to the supply which nature has bestowed upon her, and which denies to another, animated by precisely the same amiable motive, the privilege of making up for nature's deficiencies by the use of rouge. Perhaps if the paint were applied after the manner of the Cherokee Indians, so as not to deceive anybody, it might satisfy the æsthetical scruples of some of our friends of a certain school.

Sir Joshua Reynolds says in one of his Royal Academy discourses, "If a European, when he has cut off his beard, and put false hair on his head, or bound up his own natural hair in regular hard knots, as unlike nature as he can possibly make it, and after having rendered them immoveable by the help of the fat of hogs, has covered the whole with flour put on by a machine with the utmost regularity; if, when thus attired, he issues forth and meets a Cherokee Indian, who has bestowed as much time at his toilet, and laid on with equal care and attention his yellow and red ochre on particular parts of his forehead and cheeks, as he judges most becoming; whoever of these two despises the other for this attention to the fashion of his country, whoever first feels himself provoked to laugh, is the barbarian."

Now, no doubt there is a right and a wrong in most of these matters, which may be discovered when the search is worth the trouble, but it does not follow that what is right now must be right in all time. We speak not here of fashions which change without apparent reason.

Ten years hence it is possible that gold and silver, now so highly prized as decorative appliances, may, in consequence of a depreciation in the value of the precious metals, have become vulgar and commonplace; but the great principles which ought to guide the artist or decorator will ever remain the same.

In the region of man's inner nature lies a mine, inexhaustible to him who can trace the deep workings of the human soul and embody them in visible form. There must the artist seek the principles which are to guide him in the exercise of his profession.

"Custom, the Queen of the World," has a vast dominion, and her subjects are slaves. But these are the unthinking and vulgar. The man of original independent genius will disdain to wear her fetters, or to sacrifice essential principles at her command. Somewhat he may concede, in matters non-essential, out of deference to the powers that be. But as "deep answereth unto deep," he will ever intuitively recognise permanent and intrinsic excellence, and in all matters where esseutial principles are infringed, will abjure the transient fashions of the day.

Proceedings of Societies.

London Photographic Society.

The usual monthly meeting of the society was held in King's College, on the evening of Tuesday, May 3rd, the Hon. Warren Vernon in the chair.

The minutes of a former meeting were read and confirmed.

Various fine specimens were exhibited by Messrs. Hughes, Cooper, Macfarlane, and others.

The following gentlemen were elected members of the society:—Messrs. A. Johnson, E. Aldis, W. H. Sandford, R. Murray, Philip Parsons, G. H. Macfarlaue, E. M. Stone, and S. Sampson; Miss Hurt was also elected.

Mr. Dallmeyer exhibited a photo-heliograph he had just completed for the Russian Government, and read a description of it.

Mr. Hennah then read a short paper on his method of printiug on plain paper.

Mr. Skaife exhibited aud explained a photographic cabinet or portable laboratory for the drawing room, with which his pistolgraph or miniature camera could be worked, without soiling fingers, dresses, or carpet, the apparatus being so arranged that the manipulations could be carried inside the cabinet with one hand, by the sense of touch only: the aim being to enable ladies to photograph their babies or other subjects, without the trouble of setting asido a dark room, &c. Mr. Skaife also exhibited a number of his pretty little portraits on glass and paper, mounted iu various ways, and also some enlargements therefrom.

In answer to Mr. Hughes, Mr. Skaife said the lens was the essential source of rapidity in his camera. It was the result of much experiment, and was now made for him by Mr. Dallmeyer, according to a design supplied to him.

The Chairman read a letter from M. Placet, calling attention to an extract from a communication he made to the French Photographic Society, on the 4th of December last, and subsequently published in the *Bulletin* of the Freneh Society. In this communication one of the methods proposed for securing the desired result in a system of photographic engraving, consisted in spreading a plate of glass with two or three coatings of collodion, covering this with bichromated gelatine, and when dry detaching the compound film, and exposing under a negative, collodion side in contact with the negative. This film was afterwards transferred to metal, to be subjected to further treatment for securing the engraving. Having given the extract, he charged Mr. Swan with having copied textually from this communication, and added that Mr. Swan could not plead ignorance of it, as in one of his earliest communications on the subject, he referred to M. Placet by name.

[No discussiou arose on this letter, and we conceived it better to allow the matter to remain for Mr. Swan's reply at the next meeting. But as Mr. Swan's reference to M. Placet was in our own columns (see p. 86 of the present volume), we may explain that the mention of his name was simply to state that Mr. Swan had obtained, some months previously, more than M. Placet even proposed. We can add our personal knowledge that Mr. Swan had attained successful results in carbon long before M. Placet's communication was made or published. M. Placet's communication had no refereuce to a carbon process. It will be found on p. 53 of our present volume.]

The Chairman announeed that Mr. Sydney Smyth was unable to proceed with the promised experiment with the magnesium light, being unable, at present, to get a supply of the wire. He hoped to be ready by the next meeting.

After votes of thanks to the gentlemen who had made communications, the proceedings terminated.

The American Photographical Society.

The regular monthly meeting of the Society for March, was held on Monday evening, 14th ult., at University Chapel. Vice-President Abraham Bogardus in the chair.

The minutes of the last meeting were read and approved.

Iodide of Cadmium.—Professor Joy presented for consideration a process for tho preparation of pure iodide of cadmium, by Professor Vogel, from which he had found very good results. 20 parts by weight of iodide of potassium, and 15 parts by weight of sulphate of cadmium, are dissolved in water in a flask, with gentle heat, and evaporated to dryness also with care. A crystalline residne will remain, which must be covered with absolute alcohol, and warmed. In this way the iodide of cadmium, which is easily soluble in alcohol, can be separated from the insoluble sulphate of potassium. Collect the KO SO_3 on filter, and wash out with water. Transparent mother of pearl crystals of iodide of cadmium will separate from the alcoholic solution after standing tor a day or two. Direct sunlight should be avoided. Better place the iodide of cadmium for spontaneous evaporation in a dark room. For the proportion of the sulphate, cut the cadmium fine, use dilute SO_4 to which add a few drops NO_5.

Professor Seely inquired what success Professor Joy had in crystallizing. He had dissolved cadmium, with a view of getting good crystals, and did not sueeeed very well; but he had not been careful to use the preeaution about light.

Professor Joy said he had to perform the operation in a dark place, and by a spontaneous evaporation, without too great heat.

A Strange Effect.—Professor Seely stated that he had sat for a negative at Brady's gallery, about the time of the first introduction of collodion; he sat a minute and a quarter, and had a good negative made. Two years ago he chanced to see the negative; prepared the paper and set his frame to make a picture; if he remembered rightly it began to rain shortly; he took the frame in and laid it on a shelf, where it was not disturbed until two or three weeks since, wheu he had occasion to use the frame; he opened it, and found the paper blackened pretty thoroughly; but what was remarkable was that instead of a positive being printed, he had a *fac-simile* of the negativo. Whether it was owing to the light, or to continued contaet with the negative, he did not know.

The Chairman remarked that the process was rather slow for this age. The effect was very singular.

The late Henry Rose.—Professor Joy said he had desired to make a few remarks in regard to one who, although not directly connected with the photographic art, had yet conferred great benefit on it by his discoveries in chemistry, especially in regard to solvents. It was very rare to see so many generations of the same family eminent in one branch of science as in this case. Valentine Rose (the grandfather of him whose loss they had now to deplore), was born Aug. 16th, 1736; he studied chemistry under the famous Marggraf, whose name brought us back almost to the time of the alchemists, and who was a chemist of great celebrity. Valentine devoted himself to chemistry and pharmacy, took up his residence in Germany in 1770, and established himself as an apothecary, but died of over-work in 1771. His son, Valentine Rose, jun., was born October 31, 1762. His studies were directed by the celebrated Klaproth, upon whose advice he also devoted himself to pharmacy, and in 1792 took possession of his father's business in Berlin. He published numerous scientific papers, aud after 1800, lectured upon chemistry before the Pharmaceutical Society of Berlin, to the time of his death in 1807. Henry Rose was boru August 6th, 1795, in Berlin. He followed in the steps of his distinguished ancestors, and studied chemistry and pharmaey under Berzelius; in the summer of 1822, entered the University of Berlin, as tutor, became a Professor in 1823, and since then has continued to be the most active Professor of analytical chemistry on the continent. During the last forty years he has published two hundred papers, being an average of five scientific papers a-year. He was one of the most charming, agreeable, and best of teachers. He seemed to be possessed of the actinic ray which operated upon all who came in contact with him, developing their best qualities. He was one of the most unassuming, unpretending of the unpretending Germans—and during his (Professor Joy's) studies for two years uuder Rose, he had occasion to remark how unpretending and modest these men of science were. One peculiarity of Henry Rose was, when giving an entertainmeut at his house, to send

them all about their business at twelve o'clock, declaring that no man of science should be up later. His loss would be felt the more because it was only in September last that Mitscherlich died. While Mitscherlich represented the Courts of Europe, Rose was never tempted from his darling study. The son of Gustavus Rose (brother of Henry) is also a prominent scientific man, thus carrying it on to the fourth generation. His brother-in-law, nephew and cousins, were all engaged in science, and in their circle carried on their work supported by each other, which perhaps was one reason why they accomplished so much. Henry Rose died, January, 27, 1864. It was fitting that in this Society mention should be made of one so distinguished in science.

Fading of Albumen Prints.—Mr. Duchochois read a paper on the fading of albumen prints.

The Chairman said his attention had been called to pictures turning yellow, and on conversing with Mr. Fredericks about it, they came to the conclusion that it was caused by sour paste being used in making the cardboard.

Mr. Mason remarked that he had experienced the difficulty, some years ago. He found, on inquiry, that the party from whom he had cardboard, had been using sulphur for bleaching purposes. At that time nearly all his pictures turned yellow, and were spotted.

Mr. Boltwood thought that the hyposulphite employed by paper manufacturers to discharge the chlorine used for bleaching purposes, not always being properly got rid of, had something to do with causing yellowness.

A New Fuming Process.—Mr. Weeks said he had modified the ordinary fuming process for printing, so as greatly to increase the sensitiveness. He adds ammonia to a solution of iodine in alcohol, and exposes his silvered papers to the fumes rising from this mixture. After this fuming, the paper will print in about one-fourth of the usual time. Mr. Weeks had also found that sugar was a useful addition to the salting solution for plain paper; it tends to keep the picture on the surface and improves the tone. Ordinarily, he used one grain of muriate of ammonia, and two grains of sugar to the ounce (of 45 grains) of silver solution. If too much sugar was used, it generally produces metallic silver in the shadows of the picture.

Professor Seely said that when iodine and ammonia are brought together, an exceedingly explosive compound is produced. If the fact be kept in mind, and care be taken that the mixture does not become dry, there need be no danger in repeating Mr. Weeks' fuming process.

The Fading of Negatives was made the subject of discussion for the next meeting.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, May 4th, 1864.

M. Placet has addressed a letter to M. Gaudin, Editor of *La Lumière*, pointing out the great coincidence between his process of carbon printing and that recently announced by Mr. Swan, and for which process he claims priority of discovery.

In confirmation of this, he quotes the following passage from a paper presented to the French Photographic Society on the 4th of December last, on the subject of photographic engraving.

"Upon a glass plate spread one or more coatings of collodion, then a coating of bichromated gelatine; when they are dry, cut the edges of the gelatine, and the sheet of gelatine will readily become detached, carrying with it the adhering collodion film.

"This sheet is exposed to light under a negative, on the collodion side, then upon this collodioned surface, place a plate of metal covered with a glutinous matter, and pass it between the rollers of a press; the sheet is then found to be perfectly fixed with the surface of the *non*-impressed gelatine upwards, and in the conditions required to be submitted to the action the solvent.

"A single coating of collodion upon the glass plate will not always suffice to remove the sheet of gelatine easily. Besides, the collodion may be replaced by any other substance possessing analogous properties."

M. Placet goes on to say, "The resemblance of these two descriptions clearly shows that Mr. Swan has literally copied one of my patents—patents which Mr. Swan was acquainted with, as he noticed them in connection with my name, in an article published in the Photographic News."

The claims of the various candidates for the Duc de Luynes' prize of 6,000 francs will probably give the examining committee a vast deal of trouble and perplexity, inasmuch as many of the processes so nearly resemble each other as to appear identical, and the rendering of strict justice will demand strict chronological examination. The committee consists of the most competent persons that could have been chosen, and their report will doubtless possess very great interest.

At the present moment the interest of the photographic world is concentrated upon the probable convulsion in the art by the substitution of the carbon process for that with the salts of silver and gold. Progress will not cease, nor will the demands of photographic art be fully satisfied until its pictures are readily obtained in printing-ink from engraved plates, as in M. Dallas's and other processes. In these processes the difficulty to be overcome was in giving the metal plate a grain; this is obtained on Mr. Dallas's plates, it is thought, by means of an aquatint ground; in M. Disderi's process, examination by the microscope shows that a ground is produced by an infinity of very fine rectangular lines which entirely cover the surface of the plate. The result is a slight grey tone, upon which the photographic design is placed. The interstices between the lines form points, which produce an analogous effect to the aquatinta ground.

The names of the candidates for the Duc de Luynes' prize are, Garnier, Lemercier, Morvan, Marie, Pouncy, Pretsch, Poiteviu, Regnault, and Swan.

The constantly increasing demand for silver, far exceeding the supply, renders it necessary to seek means of economizing that metal in coinage, plate, &c. The usual addition to silver, to form an alloy, is copper in the proportion of 10 per cent.; this has been increased to 16½ per cent. with advantageous results. M. Peligot has made some interesting researches upon a new alloy of silver, in which zinc is substituted for copper, or added to the alloy of copper and silver. The silver alloy in which a part, or the whole, of the copper is replaced by zinc, possesses remarkable malleability. A plate, 13 centimetres long, by 14 wide, and 5 millimetres in thickness, was rolled until it measured 58 centimetres in length, and 1 millimetre in thickness, without exhibiting any flaw or fracture in the process. The new alloy possesses a beautiful white colour. Compared with the silver alloy of 10 per cent. of copper, it is equally white, while its fusibility is much greater, it is also more elastic and more sonorous. When it has become brittle from too much rolling, its malleability can be immediately restored by heating.

The silver alloy containing zinc blackens much less under the action of hydrosulphuric acid and sulphurous emanations than ordinary silver. In fact, copper appears to have a considerable influence upon the change ordinary alloys undergo, a change that is essentially due to the production of the sulphides of silver and copper; and the greater the proportion of this copper in the alloy, the quicker it blackens. The affinity of sulphur for zinc being very feeble, and moreover, the sulphide of zinc being colourless, the alloy formed of 800 parts silver and 200 zinc retains its whiteness and brilliancy in polysulphide solutions, in which pure silver and the standard alloy blacken immediately. In a manufacturing point of view, this is a most important and valuable property; for the manufacture of objects in silver is very much checked by the liability of this metal to tarnish and blacken in the atmosphere.

The absence of verdigris formed by the contact of acid liquors presents also a high degree of interest. The alloy of 80 parts silver with 20 copper, immersed in vinegar, soon

yields an acetate of copper. With the coresponding zinc alloy, the liquid, it is true, is not exempt from zinc; but it is generally admitted that the salts of this metal have a less injurious effect upon the health than the salts of copper.

A Spanish photographer has applied a varnish to his positive pictures, the brilliancy of which has astonished all those who have seen them. Unfortunately, his process remains a secret; nevertheless, a skilful photographic chemist believes that this varnish is nothing more or less than albumen. I have, however, says M. Matthys, made some experiments with collodion, which warrant the conclusion that the same results may be obtained with it The operations are simple, and permit of varnishing many hundred proofs a day. It is only necessary to pour some plain collodion upon a sheet of glass, and lay the pictures upon it. A few precautions are necessary. The paper should be as thin as possible, and well albumenized. Take a collodion with double the quantity of cotton usually contained in photographic collodion. The glass plate, being well polished, the collodion is poured evenly over the surface, and left to evaporate a few minutes more or less, according to the temperature of the operating room. Generally speaking, five minutes will be sufficient. Then immerse the glass plate in rain water, and let it remain in it until the water has moistened it uniformly, it is then withdrawn and placed horizontally upon a table slightly inclined towards the operator, so that the slight excess of water may drain off. At this moment, remove the proof to be varnished from the water-bath in which it has been previously placed, and allow it to drain for an instant, it is then laid upon the glass plate, commencing at the part where the excess of water is found, and laid down upon it in the same manner as a sheet of paper is floated on the silver bath. The excess of water serves to drive all the air-bubbles that may intervene between the proof and the glass plate. This done, cover the proof with a sheet of blotting paper, and by a slight pressure of the hand, remove the excess of water. The plate is then left to dry *spontaneously*, and when the paper appears dry to the touch, it is removed, commencing at the corners. If the plate is too dry, the proof will not become detached, it will require to be first placed in a moist atmosphere, as, for example, in a box containing a wet sponge.

Experience will show what other precautions are necessary to be taken. The principal difficulty lies in avoiding the introduction of air-bubbles while the proof is drying. To avoid them it is necessary to employ a very thin paper, well albumenized, and very pliable. It is probable that by extra albumenizing the proof before applying it to the collodion, we may make use of all the albumenized papers in the market. The employment of gelatine or of analogous substances, will probably be just as serviceable.

We can also employ iodized collodion; but more cotton must be added to it, and the glass plate covered with it must be left in the rain-water long enough to dissolve out the iodides and bromides, and it will be necessary to renew this water. Old collodion gives a slightly yellowish tint. This, however, can be avoided by adding some hyposulphite or cyanide of potassium to the first washing water.

Photographic Notes and Queries.

Swan's Carbon Process.

Sir,—Having been experimenting in London with a friend during the past fortnight on Swan's process, we have had from the first uniformly successful results, but cannot make the films adhere to the paper. They generally come wholly or partially off in the developing process, though india-rubber in benzole, both with and without dammar, and in all degrees of strength, has been tried. I shall be very glad if you can furnish us with detailed information on this point.

The making of the gelatine solution is so simple that, probably, few will ever care to purchase it ready prepared, but the manufacture of fine pigment is much more difficult. I presume Messrs. Newman or some other firm will shortly furnish pigments of all colours and undoubted permanence in the state of strong solutions; at any rate, such will find a speedy sale.

Is bichromate of ammonia recommended to be used, because it is not so easy to obtain a bichromate of potash, and because it will give the process a greater aspect of novelty, or will the latter salt do as well?

We have found that gelatine lozenges, whatever they be made of, will give a capital film and picture, and are much less expensive than the same weight of gelatine, and having been successful with this first variation are now trying *glue* at sixpence per pound. We, however, do not intend patenting our "glue process."

Black enamelled iron plates were once used for positive photographs, and they could easily be cut to any shape. White enamelled plates appear likely to prove very useful in the carbon process.

Can gold and silver be held in the gelatine solution in a finely divided state, to give novel effects?

A very unlooked-for difficulty occurred at the beginning of our experiments with the bichromate, for the silver baths, out of jealousy to the rival article, turned sulky and gave nothing but foggy pictures all day. This scientific fact deserves the investigation of the contemporary whom you occasionally apostrophize, W. H. Harrison.

Haverfordwest.

[You will find some remarks on mounting in our first article. Perhaps you omitted to use a press. 2. We have ascertained that pigments ready for use will be prepared by Newman. 3. Bichromate of ammonia is used for several reasons. It is much more soluble than the bichromate of potash, the latter requiring ten times its weight of water to dissolve it, the former only three or four times. It is also regarded as more sensitive than bichromate of potash, and it does not retard the setting of the gelatine like the latter salt. 4. Glue is simply coarse gelatine, with many impurities. 5. White enamelled plates, such as are used for enamelled miniatures will, doubtless be useful. 6. Salts of various metals can be held in solution, but it is doubtful whether the metals themselves can be. Possibly, in the form of ruby gold or silver, they may be. Much in connection with the new process remains to be worked out by experiment. —Ed.]

Talk in the Studio.

Action of Light on Honey.—The *Journal of the Society of Arts* calls attention to a photographic action observed on honey. It states that honey fresh from the comb is a clear yellow syrup, without a trace of solid sugar in it, but upon straining, it gradually assumes a crystalline appearance, and ultimately becomes a solid mass of sugar. It has not been suspected that this change was due to a photographic action, but this appears to be the case. M. Scheibler has enclosed honey in stoppered flasks, some of which he has kept in perfect darkness, whilst others have been exposed to the light. The invariable result has been that the sunned portion rapidly crystallizes, whilst that kept in the dark remains perfectly liquid. It is thus seen why bees are so careful to work in perfect darkness, and why they obscure the glass windows which are sometimes placed in their hives. The existence of their young depends on the liquidity of the saccharine food presented to them, and if light were allowed access to this, the syrup would gradually acquire a more or less solid consistency and would seal up the cells.

Splitting the Collodion Film.—Mr. Cooper relates a singular experience in transferring negatives by the plan recommended by Mr. Swan. After coating with gelatine, and varnishing according to instructions, and attempting to remove the whole from the glass, it was found that whilst a perfect negative attached to the gelatine came away, a thin film of collodion, containing a perfect but phantom image remained attached to the glass. The collodion film had been split somewhat in the fashion which bank notes have been split by an expert. The density was in the transferred image; whether that left behind would admit of further intensifying, we cannot say.

Glass Paper Clips.—Mr. Hughes has called our attention to a decided improvement in the clip for suspending sheets of silvered paper whilst drying. Instead of being made of wood

as heretofore, a material easily contaminated, and difficult to clean, the improved clips are made of glass. The construction is very simple. Two strips of glass, with all sharp edges removed, are bound together with a piece of vulcanized india-rubber tubing; a little out of the centre, between the strips and through the tube, a piece of fine glass rod is placed, which serves as a hinge or fulcrum by which to obtain the proper pressure. The result is a neat and efficient clip, a decided improvement upon the wooden articles hitherto used.

New Photographic Periodical.—A new monthly photographic journal, entitled *Photographische Mittheilungen*, has just been issued in Berlin, under the editorship of Dr. H. Vogel. It will be the organ of the Photographic Society of Berlin.

Frontispieces for Photographic Albums.—Every book is improved by an appropriate frontispiece, and the photographic album is no exception to the rule. We believe the first to supply the want which the possession of an album created was Miss Caroline Spiller, a family-name not unknown to our readers and photographers generally. This young lady produced a clever drawing of a little dog standing, with comical expression, on his hind legs, in front of his kennel, and intimating that all contributions would be thankfully received. This being photographed card size, made an admirable frontispiece, and conveyed a gentle suggestion to each person who inspected the book. Several imitations or fresh designs followed; but Miss Spiller has now designed a second frontispiece, not, we hope, to displace the first, but to grace a second album for those who have filled one. The subject here is a good-tempered, laughing, little crossing-sweeper, who has swept the mud near his crossing into letters forming an appeal for contributions, for which the cap in his hand is held out. The drawing and composition are cleverly managed, forming a pleasing picture, and an appeal to which all friends will feel bound to respond.

The Emperor's Interest in Lenses.—It will interest photographers to learn that the Emperor of the French is interested in their art, and that on the 1st instant his Majesty honoured Mr. Henry Squire, of King William Street, London, with a command to attend an audience of His Majesty, at the Palace of the Tuileries, to inspect his new "extra rapid" photographic lens, for carte de visite portraits and various photographs, showing its rapidity, with which His Majesty was pleased to express his highest approval.

To Correspondents.

J. Lees.—We have not heard of any agent in England to whom contributions to the Philadelphia Fair, on behalf of the Sanitary Commission, are to be sent. In the case to which you refer of your own unmounted prints, possibly, if they be sent to Mr. Coleman Sellers, by book post, it will be the simplest and cheapest plan. Views of "Shakspeare's Birth-place," "Ann Hathaway's Cottage," &c., have great interest for Americans, and will, doubtless, be acceptable.

Derfla.—The mottled effect in the lights of your negative forms one of the annoyances contingent on the use of bichloride of mercury. It is chiefly caused by the use of excess of the bichloride on a negative with very little deposit of silver to commence with. It is probable that you allowed the negative to become white with the mercury before applying the iodide. In using this process, it is important not to allow the mercury to act too long; if the colour get beyond a grey, the result will not be good.

Young Photo.—A portrait lens is generally used for enlarging with the solar camera. 2. A half-plate lens is not suitable for taking a head 3 inches long. Experience and judgment are necessary to determine the scale upon which objects may be taken with a given lens; but the use of lenses of short focus close to the object will always give distortion, and unnaturally violent perspective. 3. A printing bath is best used neutral. The presence of nitric acid will make the paper less sensitive, but it is probable it will make the bath less liable to discolour. 4. The colour of the print before toning is influenced by many causes. Printing in sunlight will give a reddish tone, and in diffused light a bluish tone. The different qualities of negative will also make a difference, and also the different length of time which the several sheets may have remained on the silver bath. Much of the information you require is only to be obtained by experience, and cannot be stated in brief sentences.

The Photographers' Protection Association.—Mr. Warner, of Ross, writes as a member of this association to repudiate any cognizance of, or sympathy with, the practice of its solicitor to Mr. Bennett, as described in our last Number. Although in no way connected with Mr. Bennett in business relations, he strongly reprehends the unfair usage to which he has been submitted.

Cur Nescire?—It is better to keep the chloride of silver formed by adding salt to washing waters, the spoiled prints and paper clippings, and the waste fixing solutions, &c., separate, as the silver they each contain is best recovered from each by different methods. The details of dealing with each are given in a chapter devoted to the subject in our last Year Book.

Wellington Place.—Nitrate of silver can be made by dissolving silver coin, &c., by dissolving in dilute nitric acid with gentle heat, then evaporating the acids and crystallizing. For details, mode of purifying, &c., see an article in our 5th volume. 2. So far as we can judge the light in your van will, with a proper arrangement of blinds, give very good results.

J. W. P.—It is better not to use vulcanized India-rubber for the top of a water-tight bath, but the ordinary unvulcanized India-rubber. If you use the former, attach with India-rubber cement a thin piece of sheet gutta-percha, or ordinary india-rubber, to prevent the other coming into contact with the bath. 2. A bath made of wood will answer for fixing solution. It may be varnished inside with lac varnish. 3. Wax or paraffin may be used as a varnish to labels. Paraffin may be had of the chemists. 4. Your yellow paper is not sufficiently non-actinic to exclude light satisfactorily. Your letter got mislaid, or it would have been answered earlier.

Mr. Swan's Carbon Prints.—Several correspondents have written to us to beg, purchase, or borrow specimens of Mr. Swan's new carbon process, requests which, we regret to state, we cannot supply. We believe that Mr. Swan has some hundreds of copies ordered at the present time, without any leisure to produce them. Our own copies we have pleasure in showing to any photographers as opportunity occurs, but we cannot undertake to send them out.

A French Reader.—We are unable to state where the oxyethylate of silver can be obtained. It is stated by Dr. Schnauss to consist of a mixture of nitrates of silver and lead, and acetate of lead. We have not much faith in the statement made in regard to its value.

J. C. S.—All the manufacturers of albumenized paper can supply it unalbumenized if necessary. You will find the names of several in our advertisement pages.

R. C. H.—In your pictures generally there is too much front light, and a general tendency to under-exposure. To make your lens cover well you must be content to use a much smaller stop and give longer exposure. The lower parts of your figures do not appear to be well illuminated. The prints you received as specimens are worthless for the purpose. The only plan to secure good specimens to work up to is to select a few carefully from the stock of some dealer or publisher.

J. P. F.—If the toning bath be kept in the light it will sometimes induce a tendency to cause a general pink stain. Sometimes a certain sample of paper will induce a similar result from a general reduction of gold in its texture.

A Beginner.—A solution of bee's-wax will preserve the roller from rust.

P. H. M.—The extract from *Galignani* is a very clever condensation of our own description of Mr. Swan's process. The name is mis-spelt, "Sivan," from the French compositor's error, and want of familiarity with the letter *w*, which does not occur in the French language.

Old Joe.—A mixture of honey and water, treacle and water, or glycerine and water, may be applied to keep the developed film moist for a day or two before intensifying; or the film may be allowed to dry without much disadvantage.

C. C.—Whichever design you employ, it will be better to have more slope to the roof. If the old form have answered, it is not necessary to change; but, on the whole, the new design is best; much depends upon the arrangement of blinds in either. Have the side-light glass to the top.

John Gurney.—Amongst the most recent photographic works which we can remember are "Hughes' Manual;" "The Universal Text Book of Photography," issued by Harvey Reynolds and Fowler; "Practical Photography on Glass and Paper," Negretti and Zambra; "Fowler's Silver Sunbeam;" and our own Year Book of Photography.

Governon Redin sends us a very interesting photograph of an old man with a horn projecting from his forehead, about as long as his nose. The horn has just been safely removed in the County Infirmary, the photograph having been taken first as a record. We may take occasion in mentioning this, to remind our readers of the appeal of Dr. Wright, made in our columns some time ago, in behalf of the library of the Medical and Chirurgical Society of London, in which it is desired to preserve photographs of all abnormal conditions of the human frame. We shall forward the specimen in question to Dr. Wright, and we once more refer our readers to his communication on page 15 of our last volume, and suggest that photographs of all cases of disease, accident, surgical operation, deformity, or abnormal growth, will materially aid the cause of science. Dr. Wright's address is 23, Somerset Street, Portman Square.

Several articles and letters are compelled to stand over until our next.

Several correspondents in our next.

Photographs Registered during the Past Week.

Messrs. J. J. Dutton, 44, Milsom Street, Bath,
Three Photographs—Interior of St. John the Evangelist's Roman Catholic Church, Bath.

Mr. John Hudson, 62, Queen Street, Hull,
Photograph of J. Lumsden, Esq., Mayor of Hull.
Photograph of T. Thompson, Esq., Imperial Royal Austrian Vice-Consulate, at Hull.

Messrs. W. and D. Downey, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of T. Hedley, Esq., Mayor of Newcastle,
Photograph of W. Hunter, Esq., Sheriff of Newcastle.
Photograph of Dr. Leone Levi, of London.
Photograph of Rev. W. Chalmers, of London.

Mr. John Frew, 7, Railway Terrace, North Shields,
Photograph of Dr. Dodd,
Two Photographs of J. S. Edgington, representing the statue of Wm. Shakspeare at the Theatre Royal, North Shields.
Photograph of Rev. George J. Duncan, D.D.
Photograph of Rev. Henry Hine.

Messrs. Crabb Brothers, 67, West Nile Street, Glasgow,
Photograph of Rev. Samuel Martin, Westminster.
Photograph of Dr. George H. B. McLeod, Glasgow.

Mr. John Beattie, Strathearn House, Clifton,
Two Photographs of Rev. Cannon Hensman.
Photograph of Lord Combermere.
Photograph of Lady Combermere.

Mr. Wm. Wilby Law, 49, Gold Street, Northampton,
Photograph—View of the "Town Hall," Northampton.

Mr. S. H. Jeffryes, 1, Barnes Place, Mile End Road,
Photograph—"Foresters' Emblem."

Mr. Robert Slingsby, 2, Norman Street, Lincoln,
Photograph of George Oliver, D.D., in Masonic Dress.

Mr. James Katterns, 7, Gold Street, Northampton,
Photograph of the New Town Hall, Northampton.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 297.—*May* 13, 1864.

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THE NEW COPYRIGHT BILL.

THE new Copyright Bill, introduced by Mr. Black, is one of the most sweeping measures relating to the interests of literature and art ever brought before the Legislature. No less than nineteen existing copyright Acts are proposed for repeal at the outset. That there is urgent need for a reconsideration of the several Acts which form the basis of present legislation in relation to copyright, there can be no doubt. The obscurity, uncertainty, and contradictory character of the various enactments have been a source of endless discontent and litigation. The consolidation, therefore, of the various laws into one consistent Act is a most important and desirable measure. In proportion, however, to the sweeping character of the changes intended, it becomes imperative that all the interests involved should be carefully considered, and that in making the operation of the law simpler, none of those for whose benefit the law is established shall be placed in a worse position than before.

Our present interest on the subject is chiefly confined to those enactments affecting photography, and some of these, we regret to say, will place photographers in a worse position than they stand at present, for whilst it gives them relief from one of the evils not removed by the late Fine Arts Copyright Act, it does so on conditions which will be practically impossible. It gives the photographer a copyright in every portrait he takes, thus putting an end to the twopenny piracies; but as it increases the fee for registration of each picture to half-a-crown, a sum which constitutes such a heavy percentage on the price of ordinary portraits, that registration becomes out of the question.

Without entering into a general analysis of the provisions of the Bill, we shall just give the two or three clauses especially interesting to photographers. The first relates to the acquisition of copyright, from which it will be seen that the copyright of all works of art, whether commissions or otherwise, vests, in the absence of any agreement to the contrary, in the artist; who shall not, however, have the right to multiply copies of works executed on commission, as almost all portraits are, without permission from the person commissioning the work.

8. The author, being a British subject, or resident within the British dominions, of every original sculpture, model, or cast, painting, drawing, engraving, or photograph, or other work of art which shall be or shall have been made either in the British dominions, or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act, shall have copyright in such works of art, and he and his assigns shall have the sole and exclusive right of copying, engraving, reproducing, and multiplying such works of art, by any means and of any size, for the same term as is prescribed to the authors of a work of literature by this Act, provided his name, and the date of publication be marked on such work of art; provided that when any sculpture, model, or cast, or any painting or drawing, or the negative of any photograph, shall, for the first time, after *the passing of this Act* be sold or disposed of, or shall be made or executed for or on behalf of any other person for a good or a valuable consideration, the author or artist thereof shall not produce copies, or engravings, or photographs of the same, unless he have leave to do so, by an agreement in writing, signed by the proprietor of such work of art.

The period here referred to as being prescribed to works of literature is during the life of the author, and for seven years after his death; or for forty-two years altogether, should his lifetime and the seven years fall short of that period. Why a limit should be placed to the period in which a man's property, in his mental labour, the produce of his hand and brain, may be held, we don't pretend to understand. If he acquire land, or build houses, his property therein is permanent; if he write a book, or produce a picture, his property therein must lapse to the public in less than half a century. The next clause we quote relates to the mode of registration, and the fees to be paid:—

16. There shall also be kept at the Hall of the Stationers' Company a book or books, entitled "The Register of Proprietors of Copyright in Sculpture, Paintings, Engravings, Drawings, and Photographs, and other Works of Art," wherein shall be entered a memorandum of every copyright of such works of art, and also of every subsequent assignment of any such copyright, according to the forms No. 1 and No. 2 in the schedule B to this Act; except that the forms of entry may be varied to meet the circumstances of each case, with a short description of the nature and subject of the work registered, and in addition thereto, if the person registering shall so desire, a sketch, outline, or photograph of the said work; and no proprietor of any such copyright shall be entitled to the benefit of this Act until such registration, and no action shall be sustainable nor any penalty be recoverable in respect of any infringement of copyright before registration; and that the sum to be demanded by the officer of the said Company of Stationers for making any entry of sculpture, paintings, engravings, drawings, and photographs, and other works of art, shall be *two shillings and sixpence*.

This is a point which demands the immediate attention of photographers, who should petition against the sum mentioned as a fee in the case of photographs. In registering a painting worth ten pounds or a thousand pounds, the sum is insignificant enough, and can never be a heavy tax on account of the limited power of production; but in the case of photographs, where the price is small, and the number great, the sum would be found an intolerable tax, depriving photographers largely of the benefit of the Act.

The penalties incurred by pirates, for producing or importing pirated copies, are a penalty of ten pounds for each offence, with the surrender, to the proprietor of the copyright, of all the pirated copies and negatives; and for any one who shall publish, sell, expose, or even possess any pirated copy, a penalty of five shillings for each copy, to be paid to the owner of the copyright.

We have not space for noting the other provisions of the Bill, and it is not necessary, perhaps, for photographers that we should do so. But the registration fee is a subject demanding immediate attention and prompt action.

THE NEW CARBON PROCESS.

Various Manipulations.

The first experiments, in which we have begun at the beginning, with the New Carbon Process, have been fully as successful as we could have anticipated. With the first sheet of the tissue we prepared we have obtained pictures with many points of excellence, and although not perfect, possessing only such faults as are referable to definite and avoidable causes; faults, such indeed as we are glad to have met with, as they enable us to point out the causes to our readers.

The Gelatine.—We commenced with an ordinary sample of gelatine, in curled filaments, not distinguished by any name, and costing sixpence per ounce, an unnecessarily high price, we fancy, for an article for this purpose. We have tried, since, the gelatine lozenges, recommended by a correspondent in our last, and these are but one penny per ounce, but we found they possessed too much sugar for this purpose. Four ounces of the gelatine and two ounces of white sugar were placed in sixteen ounces of cold water, and subsequently dissolved by placing the bottle containing it in another vessel of hot water. This solution was tolerably clear, and we therefore used it without the addition of albumen or any other clearing or filtering, a course not generally to be recommended, although we did not perceive any evil result in this instance.

The Colouring Matter.—One ounce of the gelatine solution was then coloured with a mixture of indian ink, purple madder, and prussian blue, just hastily rubbed down on a porcelain palette. To prepare a large quantity of tissue with pigment rubbed down in this way, would be an intolerable trouble, although as regards results it answered the purpose admirably. Since then Mr. Newman, of Soho Square, has prepared for us some liquid indian ink, and some crimson and blue as well, upon which we shall shortly report. Pure indian ink is an admirably fine black, and a warm grey in its tints, but the green oxide of chromium formed in the tissue by the action of light on the bichromate, besides rendering the gelatine insoluble, has of course a tinctorial effect, and the picture produced, when indian alone is used, has an unpleasant greenish black hue. This requires correcting, by the addition of crimson and blue in proportions to suit the taste, experience readily suggesting the right amount. Experience must be the guide also in adding the colouring matter to the gelatine solution, a drop of which placed on a plate of glass, will readily enable the operator to judge of the amount of colour present. It is important that the colouring matter be in the finest possible state of division; if it be at all coarse, or the solution turbid, the picture will be granular, and resemble a lithograph.

The Bichromate.—It is probable that a saturated solution of bichromate of potash might be used with some success, but it is doubtful whether equal sensitiveness would be obtained. Chromic acid might also be used, but it is probable the results would be less under control. As we have before stated, bichromate of potash is much less soluble than the salt of ammonia, and the proportion of the active agent which could be conveniently used with the potash would be much less than with ammonia; besides that, the potash appears to have a great tendency to retard the setting of the gelatine film. The effect of adding too much of the bichromate is to cause the gelatine rapidly to become insoluble even without the aid of light. The effect of having too little is insensitiveness, and a ready tendency to loss of half-tone, the more delicate parts of the image readily dissolving away. About one part of the bichromate solution (containing one ounce in three of water) in ten of the gelatine solution, appears to give the best results. We used the sample by Busch & Co., of which we spoke last week. It is of a very deep orange, and in very small regular crystals. Some samples are much lighter in colour, dryer looking, and less soluble. We used one part of a saturated solution in eight of gelatine solution.

The Collodion.—The character of the collodion is very important. It should be tough and very transparent, the film free from the slightest opalescence or opacity when dry. We are inclined to think that a thick collodion is best. Mr. Nichols, in a letter which will be found on another page, thinks that a thin film is best. Mr. Swan uses the uniodized collodion which his firm prepares for negatives: it gives a thick, tough, transparent film which answers admirably. We tried two samples of uniodized collodion sent out commercially for negative purposes, both of which gave, however, some opalescence.

Forming the Tissue.—The collodion film being quite dry the plate was warmed as though for varnishing. The prepared gelatine solution was used at a temperature of about 120° Fah. The solution was poured along one edge of the plate, which was then gently inclined, and the gelatine lead by a camel-hair pencil so as to flow evenly over the plate. Mr. Swan finds now that a glass rod is better, as there is danger, if the camel-hair pencil be worked about much, of forming minute air bubbles like pin points, which will show as white spots in the finished picture. The thickness of the layer of gelatine is now to receive attention. If the sample of gelatine have a good body, and be used at the temperature we have named, coating the plate, and allowing a little to flow off, will give a good tissue. But if, as in our first experiment, the gelatine have little body and form a thin solution, it will be more difficult to get the tissue of the right thickness. It will then be necessary to pour on sufficient solution, and then place the plate carefully on a levelling stand to set. If the solution be of the right thickness, the plate may be held in the hand, and gently inclined so as to keep the gelatine in an even layer, and it will set sufficiently to prevent further flowing, in a few minutes. With a thin solution, the setting being slow, it is better not to keep the plate in the hand, as there is danger of it setting in uneven waves, unless it be carefully levelled and left at rest.

If the tissue be too thin, there is a tendency to a weak picture, feeble in the blacks, and with want of half-tone. If the film be too thick, there is not much danger of getting a bad picture, but the tissue is more intractable in mounting, and the development is slow from a thick layer of unaltered gelatine and pigment having to be dissolved away before the image is reached.

When the layer of gelatine is set, it can be placed in any position without danger, and put away to dry. The time required varies with the thickness of the tissue, and the temperature. If a temperature of 80° Fah. be maintained, it is probable that twelve hours would dry a tissue of moderate thickness. At 50° or 60°, especially if the atmosphere be humid, thrice that time or more will be required. If the tissue be prepared at night, and left lightly covered before a fire, with precautions as to keeping the room dark, the tissue would probably be ready for use in the morning. It is probable that a good desiccating box will be useful here. It is better to prepare it in sheets, of 10 by 8 or larger, and cut it up to such sizes as may be required on the plate before removing it.

Keeping and Exposure.—The keeping qualities of the tissue promise better than we at first anticipated. Our first tissue was prepared on a Monday evening, and not exposed until Friday, and then proved to be in excellent condition. Some tissue received from Mr. Swan, prepared on the Monday, was exposed on the same day, and was also in good condition, giving fine pictures with two minutes' sunlight exposure; but being a thick film, keeping seemed to have rendered the process of development very slow. Keeping seems to increase the sensitiveness, and this is only what might be expected. As the bichromate would gradually render the gelatine insoluble, even in the dark, the action of light is slightly anticipated by time, and eventually wholly anticipated if the tissue be not used. It follows, therefore, that the change producing insolubility in the gelatine having been commenced by the slow decomposition of the

chromic salt, which has begun to give up oxygen to the gelatine, a very slight exposure to light completes the operation, and thus the tissue is more sensitive after keeping a few days than at first.* With Mr. Swan's tissue, two minutes' exposure gave a good picture on Friday; on Saturday the same exposure gave us a picture which, after many hours' development, and every effort at reducing its depth, was hopelessly over-done, although in other respects a good picture. We have found that from two to five minutes, varying with the intensity of the negative, was sufficient in sunlight, and from five to fifteen minutes in bright diffused light. We have not sufficiently tested a very dull, diffused light, but are inclined to believe that in dull light the tissue requires more exposure than a silver print.

Mounting.—Our experience is not perfectly satisfactory here as yet. We have met with some uncertainty, succeeding at times perfectly, at other times indifferently. But it must be remarked that succeeding once proves success to be possible, perfect knowledge of the conditions of success and good manipulation alone being necessary. We have tried several materials, but nothing answers so well as india-rubber solution, the paper and tissue each being floated, allowed to dry, and pressed into contact. This in many cases answers perfectly. On this subject, however, we shall have more to say in future.

Development.—In this part of the process it is most important to use patience. We have spoiled one or two pictures in over anxiety to gain results quickly. If the tissue be freshly prepared and not too thick, and the exposure right, the image will be fully cleared in from fifteen to thirty minutes with water at a temperature of 100° or a little more. With such a picture an increase of temperature, or pouring the hot water on the face, will be likely to remove the half-tone in patches. Under-exposure will produce a similar result. Five or ten minutes' soaking are generally necessary before any sign of an image appears; during this time the bichromate flows out, tinging the water a bright yellow. It is as well to change the water a few times so long as any trace of the bichromate is seen. When once the bichromate is dissolved out and the image is partially developed, daylight does not appear to injure the picture. If the tissue be old, and also thick, very considerable soaking is necessary before any image appears, and then it develops very slowly. It may be assisted in such case by helping to clear away the unaltered gelatine and pigment with a camel-hair pencil, but unless done with great care the picture may be injured. In one or two cases, with a very old sample of tissue, we have found, after half an hour's soaking, that a thin film, or pellicle, quite insoluble, might be removed by rubbing the surface of the tissue with the finger, after which development progressed more satisfactorily. One of the greatest evils accompanying the necessity for long development is the danger to the mounting, the tissue having, with long soaking and increased heat, a greater tendency to leave the paper. The greatest danger in developing, which we see at present, is the temptation to use water too hot, or to pour it directly on the face, and so from thin, or new, or slightly under-exposed films, remove half-tone in patches. When the image is sufficiently developed, it is best to place the picture in cold water at once, which stops further progress and rinses the picture.

Transferring.—The process of transferring, so as to non-invert the picture, is very simple, if the mounting of the tissue have been effected with india-rubber. We have simply used strong paste as the adhesive material, pasting the picture face downwards on to another piece of paper. When dry, the first mounting paper may frequently be lifted away without any trouble; or, if it be found to adhere, moistening with benzole will cause it to leave at once. In cases where the blacks are in much relief from a thick layer of insoluble gelatine and pigment, it is necessary, in transferring, to use an adhesive material with sufficient body to fill up insterstices, when dry; otherwise, perfect contact between all parts of the image, and of the paper, will not be insured. Mr. Swan has used gelatine and zinc white for this purpose with success. It is very necessary to allow the last mounting to be perfectly dry before attempting to remove the first paper, or the film will be damaged.

We hope, shortly, to report on tissue produced by ourselves, with Mr. Swan's materials, a supply of which we have received.

* A letter just received from a correspondent, and which will appear in our next, confirms this view.

Scientific Gossip.

A letter which appeared in our impression for the 29th ultimo must have surprised many of our readers no less than ourselves. We are told that the information we have been so freely giving for some years past respecting the adiactinic value of samples of yellow and orange glass for the dark room is of little or no value, and that the only safe test is to expose a sensitive collodion plate, close behind the glass to be tested, to the direct solar rays for eight or ten minutes. Now, we have no objection to make to this test; if a sample of glass will stand it, well and good, the fortunate possessor may congratulate himself on owning a transparent medium behind which he can prepare and sensitize collodion and all other plates in sunshine or shade, with the absolute certainty of no chemical light passing through to injure them. There is only one objection, we do not believe that there yet exists a sample of glass, suitable for illuminating the photographic laboratory, which will stand such a test, if fairly tried; certainly, we have never met with such a glass during our examinations on the subject, which have extended over the last 12 years. Mr. Smartt may be quite correct in saying that samples which have given no indication of the transmission of chemical rays, when tested by their visible spectra, have repeatedly proved useless under the test of a wet collodion plate exposed to sunlight; but it is not right to assume from this that the spectroscope is not to be depended on for the purpose of testing glass. Light and dark, transparent and opaque, are terms of degree only, and what they are supposed to represent does not exist in its absolute sense. So also sensitive and insensitive, as applied to collodion plates, are terms which must not be used in their absolute value, irrespective of surrounding conditions, but must be applied with reference to the ordinary circumstances under which the plates are used. A sample of orange glass on a collodion plate must be tested in a similar manner to an iron girder. The greatest strain which it is ever likely to bear in ordinary practice is first estimated, and then this is doubled or trebled. If it stands that, it may be looked upon as safe, but it would be obviously unfair to test a beam which was only required to bear one ton, by crushing it under 100, and then to say it was unfit for its proper work; and yet, that is in effect what Mr. Smartt proposes to do.

Neither is the reason given for the action on the collodion plate taking place behind the arranged glass in full sunshine the correct one. Certainly the chemical end of the spectrum extends far beyond the visible portions. In a pure solar spectrum, formed entirely with quartz lenses and prisms, the chemical spectrum is about ten times the length of the invisible one, the whole of the latter, when copied on iodide of silver, spreading out from a space in the indigo to far beyond the violet. The interposition of a microscopically thin piece of glass cuts off a considerable slice from the higher and more refrangible end, whilst glass of ordinary thickness is opaque to more than half of them, and a photographic lens scarcely transmits one-fourth. Glass with a shade of yellow allows only the visible portion of the chemical rays to pass (the indigo, violet, and lavender), whilst common yellow glass cuts off all rays above the blue, and, consequently, all rays which act chemically on iodide of

silver. As, however, bromide of silver is sensitive to light of as low a degree of refrangibility as the green rays, we never advise photographers to employ any but a peculiar dark shade of orange, the colour of which is communicated by silver, and which must be tolerably familar to most of our readers by this time, judging from the many samples we have reported upon. This coloured glass entirely cuts off all rays above the green, and may, therefore, be used with perfect safety for ordinary photographic purposes. It appears to be the impression in some quarters that a sample of glass may appear quite opaque to the visible chemically active rays of the spectrum, and yet be transparent to certain of the invisible rays of a higher refrangibility. This opinion, as far as our present knowledge is concerned, is totally erroneous. We have never either met with, or heard of, a single instance of a transparent body being opaque to the blue, indigo, and violet rays of the solar spectrum, whilst it was transparent to some of the higher rays. As we stated in our editorial note to the letter already referred to, the action of partially or totally adiactinic bodies on a ray of light is uniformly the same. The rays of the highest degree of refrangibility are always cut down first, and as the medium increases in thickness or opacity, the interception gradually proceeds forwards until it reaches the visible portion; where, as before, the violet rays are the first to go, then the indigo, the blue, and lastly the green. A medium in which the order of opacity followed a different plan to the above, would stand alone among transparent bodies, besides being of some theoretical value in optical researches. We will not go so far as to say that a body of this character does not exist; for, bearing in mind the remarkable way in which some substances carve out the spectrum into isolated bands of all degrees of width and sharpness, it is barely possible that a medium may be discovered, which shall produce a band of opacity just where the blue indigo and violet rays are. But the possible discovery of a substance which may have such an exceptional character, is not an argument to warrant a sweeping condemnation of a whole class of valuable adiactinic media.

We have already admitted that a specimen of orange glass which we should pronounce fit for use in the laboratory, would fail when tried by Mr. Smartt's test. A few words are necessary in explanation of this. In ordinary language, we speak of a collodion plate as being insensitive to the red or yellow rays, and sensitive to the indigo, violet and more refrangible rays of the solar spectrum; conversely, we say that these latter rays act chemically upon such a plate, whilst the red and yellow rays are without chemical action. We must again warn our readers that these expressions must be taken as they are meant, and as they would be understood by 99 photographers out of a 100; not in their absolute sense. If a pure solar spectrum be formed, and a photograph of it taken on iodized collodion, a good impression may be obtained (judging from our own apparatus) in about the tenth of a second. This being the necessary exposure of the plate to obtain a good picture of the chemical rays, let us suppose the experimentalist to continue the exposure with a view to ascertain what will be the action of the red and yellow part of the spectrum on his sensitive material. He may give ten times the exposure and get no result whatever. One hundred times the exposure will yet give only negative results. He may prolong the action of light a thousandfold and still get no result. Ten thousand and twenty thousand times the exposure may be given, and he may proceed in this manner, multiplying the tenths into seconds, the seconds into minutes, and the minutes into hours, and still his plate will remain unacted on by the pure red orange and yellow rays. Gradually, however, when he is approaching sixty thousand times the exposure originally given, these rays of low refrangibility give evidence of their presence. In part they act by producing a true darkening, but in other parts they show their action by preserving those portions of the iodide of silver on which they have shone, from the darkening effect of the diffused chemical light glancing off from those parts of the plate and spectrum camera on which the actinic rays have been pouring. It is thus seen that, by an *enormously* increased exposure, the red and yellow rays have an action of their own, and it is this action which will be obtained if a sensitive collodion plate is exposed to the full blaze of sunshine behind a piece of orange glass—but it is an action which could never by any possibility come into play in the ordinary process of photography, and may therefore be entirely disregarded by our readers.

THE BROMINE QUESTION AND MR. J. F. GODDARD.

BEING TWO CHAPTERS CONNECTED WITH THE EARLY HISTORY OF PHOTOGRAPHY.

BY JABEZ HUGHES.

As the period for closing the Goddard Testimonial Fund has arrived, the occasion is appropriate, not only for thanking the many subscribers for their generosity in saving a photographic discoverer and a worthy man from indigence, but also for reviewing the claims made on his behalf, and the evidence on which they rest. The recent letter of Mr. Fox Talbot in the pages of a contemporary also necessitates the step.

The purpose of the original appeal was to show that daguerreotype was indebted to Mr. Goddard; that he gave that art an impulse that has extended to subsequent processes, and, therefore, that his case was a fitting one for the benevolence of photographers. If, however, in making this appeal the claims of earlier or contemporary discoverers were not mentioned, it should be borne in mind that it was not a chapter on early photography that was being written, but a statement of the case of Mr. Goddard; and nothing could be farther from the minds of the gentlemen interested in him than intentionally to ignore the labours of others in the same field.

The year 1839 is a memorable one in photographic annals —a veritable *Anno Lucis*—for Fox Talbot and Daguerre then published their discoveries. These processes, though otherwise so singularly unlike, had one idea in common—the production of a latent image on a base of iodide of silver. Bromine formed no part of either process. Daguerreotype remained unimproved for several months after its publication, in August, 1839. In attempting portraiture, the difficulty experienced was the very long sitting required in brilliant sunshine. To obviate this, Woolcott's speculum camera was invented, and the sitting was thus materially abbreviated. In June, 1840, Mr. Goddard, then lecturer on optics, natural philosophy, &c., was engaged by Messrs. Beard and Johnson (as explained in my paper of December 15th, 1863), to apply his scientific knowledge to the improvement of the daguerreotype process. By a report in the *Morning Chronicle*, Sept. 12, 1840, it appears that Mr. Beard had an establishment for producing portraits by the aid of Wooleott's camera, at the Medical Hall, near Furnival's Inn, Holborn, London; in this newspaper report, after an interesting description of this camera, and how the sunshine was tempered by passing through blue glass screens to mitigate the painfulness of the sitting, I find it further stated "that no expense is being spared to bring the process to perfection. For this purpose experiments on an extensive scale have been carried on under the superintendence of Mr. Goddard," &c. &c. These experiments bore fruit shortly after. A printed document is before me, dated December 8, 1840, entitled

VALUABLE IMPROVEMENTS IN DAGUERREOTYPE PHOTOGRAPHY.

An account of a new means of preparing the Silver Plates for the Action of Light in Photographic Delineations of the Daguerreotype, discovered by

J. F. Goddard,

Lecturer on Optics, late of the Polytechnic Institution and Royal Adelaide Gallery, London.

Having been engaged for some time past in investigating the different means of preparing the plates for the action of light, in photographic delineations of daguerreotype, in hopes of being able to render them more sensitive, the result of my experiments has been the valuable discovery that when bromide of iodine is used

instead of simple iodine, this very desirable object is attained in a most extraordinary degree. If iodine and bromine are placed together in equal proportions, they instantly combine and form a new compound, the bright, scaly crystals of the former dissolving, and the new substance crystallizing in dark microscopic crystals of a beautiful arborescent appearance. These are exceedingly volatile, more so than the iodine alone, the vapour attacking the silver surface in a similar manner, and so delicately sensitive are the plates, when properly prepared, that the faintest light acts readily on them; even in the dull, cloudy days of a November, with a London atmosphere, if not too foggy, and there is sufficient light to produce a picture, it will, with a few minutes' exposure, be clearly delineated. I have not had an opportunity of experimenting with bright solar light since I have made this discovery, but from the experience I have had in the old process during the last summer, I have no doubt, with a clear summer sun, in London, the effects will be instantaneous. With the light of the ordinary gas burners of the shops, a picture of a plaster bust may be obtained in three or four minutes. J. F. Goddard.

In the *Literary Gazette*, No. 1,247, page 803 (published, London, December 12th, 1840), under the head of "Fine Arts," this same article appears as a communication from Mr. Goddard. The claims of this gentleman commence from this published statement; but he extended his researches and instituted a series of experiments on the haloid bodies—iodine, bromine, chlorine, and their combinations; and in March, 1841, a sealed paper was deposited in the Archives of the Royal Society, detailing some of these experiments. A copy of this paper follows together with attesting correspondence.

St. Joseph's Retreat, Hammersmith,
March 2nd, 1864.

My Lords and Gentlemen,—In the month of March, 1841, you did me the honour, at the request of Mr. Kiernan, of placing in the Royal Society a sealed paper containing notes of experiments made in the application of the daguerreotype process to the taking likenesses from life.

I had previously published my discovery of the extraordinary sensitive property of the vapour of bromine in combination with iodine. (See *Literary Gazette*, December 12th, 1840.) I was desirous to furnish a process that would be effective, simple, and practicable for artists more particularly, as in their hands it would be a most valuable auxiliary. For this purpose I commenced a series of experiments, the result of which was the adoption of the A and B mixtures, as detailed in the accompanying paper.* The time that has elapsed having brought so many scientific labourers into the field, and the daguerreotype process itself having been superseded by the process on paper of which the Hon. Fox Talbot is the inventor, I have now most respectfully to beg the favour that the sealed packet may be opened and read with the accompanying paper * on the process used at the opening of the first professional photographic establishment at the Polytechnic Institution (a copy of which paper was furnished by Mr. Beard for the use of his licensees).

It may be interesting and valuable in photography, to know that by the use of my A and B mixtures, the portraits or pictures were so eaten or bitten into the silver surface, that after being washed with the hyposulphite of soda solution, and the mercury on the plate wiped off, they remained so engraved as to be printed by the ordinary copper-plate printing process.—I have the honour to be, my lords and gentlemen, your obedient servant,

J. F. Goddard.

To the President and Council, Royal Society.

The Royal Society, Burlington House,
March 18th, 1864.

Dear Sir,—I have to acknowledge the receipt of your letter of the 2nd inst., with inclosures, desiring that the sealed packet placed by you in the custody of the Royal Society, in 1841, may be opened, and the contained writing examined.

Before proceeding to comply with your request, the officers of the Society desire to be informed what further steps you wish to be taken, when the document inclosed in the envelope has been inspected. It occurs to me that your purpose would probably be answered if we transmit to you a copy certified to be faithfully transcribed from the paper deposited by you in 1841.

I may explain that some years ago it was resolved to discontinue the practice of receiving deposits of sealed packets, but as yours was deposited anteriorly to that resolution, you are of course entitled to the advantage of any evidence that such deposit was intended to supply.—I remain, dear Sir, your obedient servant,

W. Sharpey, M.D., Secretary, Royal Society.

Mr. J. F. Goddard.

March 23rd, 1864.

Dear Sir,—I beg to acknowledge the receipt of your kind communication of the 18th inst., and in reply to the request of the officers of the Royal Society as to the further steps I desire, I beg respectfully to say that I shall feel greatly obliged by being furnished with a copy certified to be faithfully transcribed from the paper deposited by me with the Royal Society in March 1841, and for which I shall feel most grateful.—I remain, dear Sir, your obedient servant. J. F. Goddard.

Dr. Sharpey, Sec. Royal Society.

The Royal Society, Burlington House,
March 29th, 1864.

On this day a packet, inscribed "Notes, &c., of discoveries in daguerreotype, by John Frederick Goddard, March 4th, 1841," and sealed with the seal of the Royal Society, and with the seal of Lord Northampton, the late president, was opened by me in the presence of Mr. W. White, assistant secretary of the Royal Society, by the author's request. It contained a paper, of which the following is a true copy:—

20, London Street, Fitzroy Square,
March 2nd, 1841.

Notes (from the Daily Journal of Mr. J. F. Goddard) on Experiments in Photography.

1841.	Jan. 17th.	Made a small quantity of iodous acid.
,,	Jan. 18th.	Tried its action on silver plates for taking miniatures by the daguerreotype, and found it to answer, the sensitiveness of the plate being greatly increased, and the pictures more marked and stronger than any hitherto produced.
,,	Jan. 24th.	Made more iodous acid.
,,	Jan. 28th.	Tried the iodous acid, combined with a solution of iodic acid and the bromide of iodine, in taking the portrait of Mr. Beard. The picture strong, but very blue (see specimen). Afterward increased the proportions of pure iodine, and took a portrait of Mr. Carpmael; afterwards another of Mr. S. Carpmael. Much improved, pictures whiter (see specimens).
,,	Feb. 12th.	Again tried the iodous acid, and solution of iodic acid with pure iodine, and a few grains of bromide of iodine, and obtained a portrait of Mr. Johnson, sen., which is very far the most beautiful and perfect of any hitherto produced, although taken in heavy rain, in two minutes and a few seconds. The character strong and marked, not requiring to be held in a particular light to catch the most beautiful effects, being clearly and distinctly seen in any position, even by artificial light. Afterwards took one of myself (see specimens).
,,	Feb. 16th.	Took a beautiful portrait of my father (Mr. Goddard, of Chatham), by the same process as above; time, very cloudy and dark, 2 min. 10 sec.
,,	Feb. 18th.	Attending the meeting of the Royal Society at Somerset House, and showed the portraits of Mr. Johnson, taken on the 12th, and also of my father, taken on the 16th, to the President, the Marquis of Northampton, Sir John Lubbock, Dr. Roget, Prof. Wheatstone, Mr. Kiernan, R. H. Solly, Esq.

Signed, Jno. F. Goddard.

Certified by W. Sharpey, M.D.,
Secretary of the Royal Society.

March 29th, 1864.

The general claims of Mr. Goddard may be allowed to rest on the above published and documentary evidence. In the next Number, reference will be made to the other early introducers of bromine, with an endeavour to assign to each their respective values as discoverers and improvers of photography.

(*To be continued.*)

* The paper alluded to, descriptive of the A and B mixture, is a lengthy document, and chiefly consists of the mode of preparing and using certain preparations of iodine, chlorine, and iodous acid that Mr. Goddard introduced in daguerreotype. Its value appears to have passed away with the process to which it refers, and its present interest is only as descriptive of the process used at the first English photographic establishment.

TABLE OF PROPORTIONS.

To Assist in Preparing Solutions.

BY C. W. SMARTT.

The following I have found very useful in making solutions for developers, &c. It shows at a glance the quantity of either a solid or liquid required to give any number of grains or minims to the ounce, from 1 to 40. The quantity calculated for is 80 ounces. This is, of course, easily divided or multiplied, according to circumstances, but being a quantity much in use, I have taken it as the standard.

TO EIGHTY OUNCES OF WATER.

Grains per Ounce.	Ounce	Drm.	Scple.	Grains.	Minims per Ounce.	Ounce.	Drm.	Minims.
1	..	1	1	0	1	..	1	20
2	..	2	2	0	2	..	2	40
3	..	4	0	0	3	..	4	0
4	..	5	1	0	4	..	5	20
5	1	6	2	0	5	..	6	40
6	1	0	2	2½	6	1	0	0
7	1	2	0	2½	7	1	1	20
8	1	3	1	2½	8	1	2	40
9	1	4	2	2½	9	1	4	0
10	1	6	0	2½	10	1	5	20
11	2	0	0	5	11	1	6	40
12	2	1	1	5	12	2	0	0
13	2	2	2	5	13	2	1	20
14	2	4	0	5	14	2	2	40
15	2	5	1	5	15	2	4	0
16	2	6	2	5	16	2	5	20
17	3	0	2	7½	17	2	6	40
18	3	2	0	7½	18	3	0	0
19	3	3	1	7½	19	3	1	20
20	3	4	2	7½	20	3	2	40
21	3	6	0	7½	21	3	4	0
22	4	0	0	10	22	3	5	20
23	4	1	1	10	23	3	6	40
24	4	2	2	10	24	4	0	0
25	4	4	0	10	25	4	1	20
26	4	5	1	10	26	4	2	40
27	4	6	2	10	27	4	4	0
28	5	0	2	12½	28	4	5	20
29	5	2	0	12½	29	4	6	40
30	5	3	1	12½	30	5	0	0
31	5	4	2	12½	31	5	1	20
32	5	6	0	12½	32	5	2	40
33	6	0	0	15	33	5	4	0
34	6	1	1	15	34	5	5	20
35	6	2	2	15	35	5	6	40
36	6	4	0	15	36	6	0	0
37	6	5	1	15	37	6	1	20
38	6	6	2	15	38	6	2	40
39	7	1	0	7½	39	6	4	0
40	7	2	1	7½	40	6	5	20

ON THE USE OF IODINE

FOR DETECTING HYPOSULPHITE OF SODA, AND FOR REDUCING OVERPRINTED POSITIVES.

BY M. CAREY LEA.*

Most of the photographic paper used in this country is sized with starch. If we take an alcoholic solution of iodine, and add it to water in very small quantity, a few drops to several ounces of water, the iodine dissolves to a wine-red solution. A camel-hair pencil dipped in this solution, and drawn across a piece of size-starched paper, makes a deep purple mark, which instantly disappears when the paper is plunged into a solution of alkaline hyposulphite.

If, therefore, we take an imperfectly washed print, which still contains hyposulphite, and draw the brush over it, the iodine will not produce the violet colouration, and this affords an easy method of proving the presence of hyposulphite in a suspected piece of paper, either dry or wet. Two precautions are necessary; first, it must be ascertained that the paper in question is sized with starch, which is easily done by examining a fresh piece with the iodine solution; and second, it must be borne in mind that just sufficient iodine solution must be used; a light streak must be drawn with the brush. If the quantity of hyposulphite be very small, compared with that of the iodine, as if the slip were plunged into the iodine solution, the iodine would first destroy the hyposulphite, and then produce the violet reaction.

I have used this test, occasionally, for about eighteen months past. I consider it as useful for a sort of rough indication, in this way, that after prints (on paper sized with starch) are washed sufficiently to give the purple streak, an hour or two more makes them perfectly safe.

A solution of iodine is also useful for reducing overprinted positives. It may be brushed over the whole face of the print; or, if it is desirable to reduce only a particular portion, it may be applied to that part only. If, for example, the printing has been pushed so far that in the finished pictures the lights are not perfectly clear, the iodine solution may be brushed over them; or, if the shades have become mere black patches, the iodine may be applied to them. If the print is plunged into the iodine solution, its action is apt to be too strong; the brushing it over produces results more under control. The solution already described may be used, or one of one grain iodine and one grain iodide of potassium to two ounces of water. It is to be remarked that on the application of these solutions the paper, if sized with starch, turns dark purple. When the desired effect has been produced, the purple colour is to be removed by a very weak bath of hyposulphite, after which the print must, of course, be washed as usual.†

RETOUCHING PAPER POSITIVES.

BY M. DE LA BLANCHERE.

(Continued from p. 188.)

§ 10. Certain recommendations have become precepts in the retouching of positives; artists have become habituated to them without wishing it; but beginners or amateurs should remember that, within reasonable limits, they must enlarge the eyes of the model as much as possible, diminish the nose, that is to say, not to mark the nostrils too strong, and blend them with the cheek, by diminishing the white spot that marks the end, by means of a very light tone: diminish the mouth without however exaggerating this diminution, and give it a little motion, always retaining the identity of the proofs: smooth the wrinkles and even entirely efface them: smooth all bony protruberances: diminish the ears, and remake them, if necessary, especially in ladies' por-

* From the *Philadelphia Photographer*.

† I have never seen this application of iodine mentioned in print, though it is quite possible that it may not be new. I first used it more than a year ago, and communicated it at the time to one or two photographic friends.

traits, who will never be willing to confess to having ill-shaped ears: render the oval of the face as perfect as possible. As to the other details recommended to be made in the model, it will be to see if the artist can satisfy them without compromising the likeness.

§ 11. We now arrive at the dress: take a larger pencil and commence by marking the folds, softening them on the edges with a pencil dipped in clean water. The same tone is then passed over all the parts in shade, softening the edges until they are lost: then cover the side on which the light falls with a weaker tone of colour: lastly, cover the whole garment with a tone of such strength as will harmonise with the rest of the figure.

It will generally be better to keep on the weaker side in this tone, than on the stronger: for if too strong, there is the risk of losing the effects of the folds given in the photograph, and destroying the work already done: all that is required is to give strength and relief to the image, and a certain homogeneity.

§ 12. The colour must not be carried to the extreme edges of the image, as that will cause a dry appearance: on the contrary, the colour must be kept within the outlines, and softened at the edges.

As to the background, that must be strongest at the bottom, and darker on the light side of the figure than on the other, so as to produce a greater effect of contrast and relief.

§ 13. In beginning to retouch a picture, it will not be necessary for the artist to concern himself with the white spots, as the lightest of them will disappear in the course of the work. Those that remain must be covered with the proper tone. The black spots, if very large may be removed with the eraser, proceeding very cautiously. When sufficient of the black spot is removed a tone of colour is applied, as in the case of a white spot. Very small spots which cannot be removed by the eraser, without being made too large, may be made to disappear with a whitish tone, over which is applied the local tone, the white predominating. This tone must be applied very light, and repeated several times if necessary,

§ 14. Retouching proofs upon albumenized paper can be performed also, but they demand much more work than those upon salted paper because the tones of colour cannot penetrate the paper, and repeated flat tints are impossible. Those which are applied in the second place remove the first: on the other hand, this retouching has its agreeable side, as whatever is not successful can be removed, as in painting on ivory.

For this retouching the colours are ground with the following:—

Water	100 grammes
Gum arabic	15 „
Alcohol at 36°	25 „
Prepared ox gall	a few drops.

§ 15. Dissolve the gum in the water; when completely solved, add the ox gall, then the alcohol: a white precipitate will be formed: the liquid is then heated in a water bath, and shaken until the precipitate disappears: it is kept in a well stoppered bottle, so that the alcohol should not evaporate.

§ 16. This retouching cannot be made with flat tints, but by hatchings and stippling, with a light tone of colour, repeated as many times as necessary. To certain parts which require to be sacrificed, the pencil must be applied as rapidly as possible, without going over the same spot twice, else the colour first applied will be removed.

(To be continued.)

POSITIVE PRINTING.

BY T. H. HENNAH.*

I have been often asked to publish the process for positive printing which I have with much success adopted for the last ten years; and as the professional and other reasons which have hitherto withheld me have not now their old force, I have much pleasure in bringing it before you to-night.

I think it better to avoid an elaborate introduction, and will therefore proceed at once to the technical details of the process.

In the first place, the choice of paper is of much consequence; the best and most equal which can at present be obtained, and which I have used for some time past, is Towgood's positive paper. It is, however, not quite so well adapted for the process as some thick paper made by Turner, of Chafford Mills, with a manuscript mark, and sold about eight years since by Woolley and Co.

The French and German papers answer well, and yield proofs of great contrast, but of less delicacy of tone and atmosphere than we obtain with the English; they have, besides, the disadvantage of requiring a much more careful adjustment of the solutions, and do not keep so well when prepared.

No paper, whether French or English, is suitable, unless it will stand the action of boiling water.

The first solution is made in the following manner:—

Chloride of gold	60 grains
Chloride of ammonium	120 „
Water	20 ounces.

This is to be applied by floating in the ordinary manner, and the paper is to be allowed to remain until it begins to flatten out, which will, according to the temperature of the room and the character of the paper, be from half a minute to two minutes.

It is then to be hung up, either before a fire or in a warm room, to dry rather quickly, but not entirely, as it is better that it should be slightly damp when submitted to the exciting solution.

The paper in this state will keep about twelve hours in a darkened room; but I have always found that better results follow if it is excited more immediately.

The influence of light or time discolours the paper, and renders it useless by reducing the gold.

The second or exciting solution is as follows:—

A 60-grain solution of ammonio-nitrate of silver is made by dissolving 1,200 grains of nitrate of silver in 15 ounces of water, and then converting it into an ammonio-nitrate by the careful addition of strong ammonia, until the precipitate first formed on its addition is just re-dissolved. The quantity can then be made up to 20 ounces by adding more water.

If the ammonia is in excess, the proofs will be grey and weak; if, on the contrary, it is deficient, the proofs will be bronzed and hard.

The paper is to be floated on this solution from a minute and a half to three minutes, according to the same conditions which influence the time on the first solution. It must then be thoroughly and quickly dried by hanging it before a fire or in a warm room.

In winter the paper will work well until three or four days old; but in the summer or in damp weather it will not keep so well. In either case it is better to use it fresh.

The exposure to light is arranged in the usual way, and the proofs must be moderately over-printed.

The third, or fixing solution, is as follows:—To 20 ounces of water add 5 ounces of hyposulphite of soda, and 14 grains of iodide of silver; then, when the solution is complete, add 1 ounce of the 60-grain ammonio-nitrate of silver solution.

This mixture is fit for use immediately, but improves after a few proofs have been fixed in it. It should not at any time be thrown away, all that is required being to fill up the vessel containing it with fresh solution every day after use. It will be found that the quantity absorbed by the proofs allows of sufficient renewal to keep the solution in working order. It should smell strongly of ammonia, and if, from being out of use, the ammonia should have evaporated, a

* Read at a meeting of the London Photographic Society, on Tuesday, May 3rd.

small quantity should be added. In ordinary use the proofs themselves sufficiently compensate for the evaporation.

After exposure the proofs must be immersed without washing in the fixing solution, and are to be allowed to remain one hour; they are then to be taken out, drained, and laid in a single layer in a flat dish, when boiling water must be poured upon them; a fresh layer of proofs is laid upon them, and is then treated in the same way, and so on with the rest, giving boiling water to all. In about five minutes the water is to be drained off and a fresh supply of boiling water added. It is as well to repeat this a third time—in fact, it is almost necessary.

The washing can afterwards be completed by successive washings in boiling water, or in the ordinary way with cold water.

The proofs, in consequence of the complete removal of the size, are very tender, and are best dried by hanging over glass rods.

When dry, they are to be laid face downwards on glazed bibulous paper, and then ironed with an iron hot enough almost to scorch the paper.

The proofs will now by their colour indicate any errors of the process which can affect their permanency, except that of insufficient washing.

If the hyposulphite has been adulterated so as to lessen its solvent power, the iodide of silver will be precipitated in the proofs. In this case more hypo must be added, as must also be done when foreign papers are employed. Papier Saxe works better with only 10 grains of iodide of silver, and is besides better when the quantity of gold is reduced to 40 or even 30 grains.

If the lights in the proof are in the slightest degree altered from the original colour of the paper, it should be destroyed as unsafe.

An experience of about ten years, without any modification of the formulæ, justifies me in saying that proofs by this are at least as lasting as those by any other silver process. It depends for the permanency of its results almost, if not altogether, on the completeness of the washing, all other faults, as I have said, being shown at once by altered colour in the light.

I expect to be met by objections to the use of the old fixing bath, and will therefore endeavour to anticipate them by stating that I have been unable, by the most delicate tests, to discover anything whatever which can be hurtful in the darkened portions of the proofs, and nothing at all but the paper in those parts which have remained white after fixing.

In conclusion, I may state that the process has been arrived at in a purely experimental manner, involving in its different parts things already well known to us, and is the result of suggestions which have been hitherto fruitless in consequence of their incompleteness. I can particularly instance that of Professor Maconochie, whose directions for the preparation of the paper* are almost the same as mine, except in the want of a definite proportion of gold. He gave no fixing solution, and as the paper prepared with gold requires one specially adapted, his valuable suggestion has been forgotten. To him, however, is really due much of the merit of the process I have this evening submitted to you in a complete form. The certainty of the results, and the delicate neutral tone forming its chief claim to notice, would, however, have been wanting without the iodide of silver and ammonia employed in the fixing solution.

NEW METHOD OF DRY COLLODION.

BY P. J. KAISER.

When, some time ago, I wished to employ dry collodion to obtain photographs of astronomical instruments, the processes recommended for preparing collodion gave me very unsatisfactory results. The nature of my duties prevented me seeking the cause of this ill-success. Some experiments, however, convinced me that most of the substances hitherto employed can give good results only under certain conditions. For example, the results obtained by following Major Russell's process were very different, according as I made use of tannin from one manufacturer or from another. The well-known "infusion of linseed" process gives results varying with the age of the seed employed. It is naturally very difficult to determine how old the seed must be to give the best results.

I resolved to try a mode of preparation which appeared to me likely to give good results, in admitting that iodide of silver, when exposed to light, is decomposed into iodine and silver. I have succeeded beyond my hopes, for the plates of iodide of silver, prepared according to my process, have most frequently the same sensitiveness as wet plates. They will keep more than a month without losing any of their good qualities, and the development may be deferred as long after exposure to light. My process requires particularly that the collodion and the nitrate bath yield good negatives by the wet method. I believe that every collodion and silver bath that satisfies this condition will give dry plates of good quality, provided the collodion contains only iodides, and that a neutral iron bath has been employed for developing.

These conditions fulfilled, a plate, when ready to be removed from the nitrate bath, is washed in filtered rain water until the liquid flows over it uniformly. Then the plate is washed with the following:—

Absolute alcohol	100	parts
Acetic ether	2	„
Camphor	0·50	„

It is desirable that nearly all the water that adheres to the plate be removed by a single washing with the alcoholic liquid. To attain this object, we commence by gently pouring the liquid upon one corner of the plate. The alcohol drives the water before it without the two liquids becoming mixed; so that it is very easy to reject almost all the water at the opposite corner of the plate. A second quantity of the alcoholic liquid poured upon the plate generally suffices to make the liquid flow uniformly. The plate is then left to dry, resting upon a piece of blotting paper, sheltered from wind and dust. The plate will be dry and ready for use in the course of half an hour.

The picture is developed by a solution of

Pyrogallic acid	1	part
Citric acid	2	parts
Distilled water	100	

To which a few drops of a 5 per cent. solution of nitrate of silver is added, or by the iron bath recommended by Valentine Blanchard to intensify negatives. This bath is prepared by dissolving

Sulphate of iron	1	part
Citric acid	2	parts in
Distilled water	100	

Adding also a few drops of the nitrate of silver solution of 5 per cent.—*Les Mondes.*—(Extracted from the Dutch journal of photography, entitled *Fijdschrift von Photographie*, edited by Captain L. P. Van der Buk.)

* Given in a letter to Mr. Fenton, in No. 7 of the Journal of the Society, July 21st, 1853.

MEMORY, THE PHOTOGRAPH OF THE MIND.

In a recent address at the American Polytechnic Institute, Dr. Draper suggests that memory may be the result of a photographic operation on the brain.

"If, after the eyelids have been closed for some time, as when we first awake in the morning, we suddenly and steadfastly gaze at a brightly illuminated object, and then quickly close the lids again, a phantom image is perceived in the infinite darkness before us. We may satisfy ourselves that

this is not a fiction of the imagination, but a reality; for many details that we had not time to examine in the momentary glance, may be contemplated at our leisure in the phantom. We may thus make out the pattern of such an object as a lace curtain hanging in the window, or the branches of a tree beyond. By degrees, the image becomes less and less distinct; in a minute or two, it has disappeared. It seems to have a tendency to float away in the vacancy before us. If you attempt to follow it by moving the eyeball, it suddenly vanishes.

"Now the condition that regulates the vanishing phantom images on the retina is, that when they have declined in vigour to less than 1-64th of the intensity they had, while in presence of the object that formed them, they ceased to disturb the sight. This principle is illustrated when a candle flame is held opposite to the sun, or any light having more than 64 times its own brilliancy. It then ceases to be visible. The most exact of all known methods for measuring light—that by the extinction of shadows—is an application of the same principle.

"But the great fact that concerns us is this:—Such a duration of impressions on the retina of the eye demonstrates that the effect of external influences on nerve vesicles is not necessarily transitory. It may continue for a long time. In this there is a correspondence to the duration, the emergence, the extinction of impressions on photographic preparations. Thus I have seen landscapes and architectural views taken in Mexico, 'developed'—as artists say — months subsequently; the images coming out, after the long voyage, in all their proper forms and in all their contrast of light and shade. The photograph had forgotten nothing. It had equally preserved the contour of the everlasting mountains and the passing smoke of a bandit fire.

"Are there then contained in the brain more permanently, as in the retina more transiently, the vestiges of impressions that have been gathered by the sensory organs? Do these constitute the basis of memory—the mind contemplating such pictures of past things and events as have been committed to her custody. In her silent galleries are there hung micrographs of the living and the dead, of scenes that we have visited, of incidents in which we have borne a part? Are these abiding impressions mere signal-marks, like the letters of a book, which impart ideas to the mind, or are they actual picture-images, inconceivably smaller than those made for use by artists, in which, by the aid of a microscope, we can see, in a space not bigger than a pin-hole, a whole family group at a glance?

"The phantom-images of the retina, as I have remarked, are not perceptible in the light of day. Those that exist in the sensorium, in like manner, do not attract our attention so long as the sensory organs are in vigorous operation, and occupied with bringing new impressions in. But when these organs become weary and dull, or when we experience hours of great anxiety, or are in twilight reveries, or asleep, the latent apparitions have their vividness increased by the contrast, and obtrude themselves on the mind. For the same reason they occupy us in the delirium of fevers, and doubtless also in the solemn moments of death. During a third part of our lives we are withdrawn from external influences, hearing, and sight, and the other senses are inactive; but the never-sleeping mind—that pensive, that veiled enchantress, in her mysterious retirement, looks over the ambrotypes she has collected—ambrotypes, for they are unfading impressions—and combining them together as they chance to occur, weaves from them a web of dreams. Nature has thus introduced into our very organization a means of imparting to us suggestions on some of the most profound topics with which we can be concerned. It operates equally on the savage and on the civilized man, furnishing to both conceptions of a world in which all is unsubstantial. It marvellously extracts from the vestiges of the impressions of the past overwhelming proofs of the reality of the future, and gathering its power from what might seem a most unlikely source, it insensibly leads us—no matter who or where we may be—to a profound belief in the immortal and imperishable, from phantoms that have scarcely made their appearance before they are ready to vanish away!"

Correspondence.

NOTE ON ACTINISM.

Sir,—Yesterday (Friday 29th, April 1864) I had been occupied with the analysis of certain mineral residues containing a large amount of silver; about half-past 4 in the afternoon I happened to precipitate some grammes of pure chloride of silver, and was much surprised at the rapidity with which it darkened, in spite of a larger excess of nitric and hydrochloric acids in the liquid. Indeed the discoloration may be said to have been almost instantaneous. This was the more curious as the hour was somewhat late. This morning (Saturday 30th April), on going out, I remarked that the trees and shrubs had made considerable advance during yesterday; though the temperature appears to have remained about the same; the plants around Putney have shot out more buds and leaves in the course of yesterday than they have done during the whole of the previous week. This morning I precipitated another lot of chloride of silver similar to the other, and in a similar manner, at about half-past 10 o'clock, but, it did not darken with more rapidity than usual.

The article published in the *Cosmos*, in 1859, which you mention in your leading article of to-day, was contributed by M. Camarsac himself, and I remember his stating, at the time, that he could only give a general outline of his enamelling process.—I am, sir, yours, &c. T. L. Phipson.

THE NEW CARBON PROCESS.

Sir,—A few remarks about Mr. Swan's Carbon Process may be useful to those who have not the time at their disposal, to dig out the minor details by experiment for a successful issue.

To begin with the collodion: it should be *thin*, and when dry and transparent, of the *horny class*. The reason for having thin collodion is to lessen its liability to unequal contraction and splitting up during the developing process.

The rule of thumb at present reigns supreme in this beautiful process, the sooner it is thrown aside the better, as much depends upon the quality of the articles used. The samples of gelatine of different makers, each require for their solution various proportions of water varying from two parts to five parts to one of gelatine, in order to bring it into working condition. Again, for carbon, indian ink is doubtful, some samples contain only 5 per cent. of colouring matter, while others contain 50 to 60 per cent., the other portion being a tough spongy gum known as Mogador, which is not wanted; under the above conditions, definite weight cannot be used without uncertainty. A little attention given to ascertain primary definite conditions has enabled me to proceed with tolerable certainty. The formula that I prefer, stands thus:—

Nelson's best gelatine	2 ounces
Water	10 „

Dissolved in the usual way, and add 35 grains of dry spirit black calcined. To sensitize, add half an ounce of a saturated solution of bichromate of potassa. A gauge or float may be used with advantage at this stage to take the density of mixture, that a uniform layer may be always had by spreading a *certain measure* of solution on a *given surface*. To make a gauge or float for the purpose, take a glass tube about four inches long, into which sufficient mercury to sink it two thirds its length, which should be marked inside on a slip of paper, and then worked up. Six drachms of the solution described, I use to a plate 9 inches by 7. The glass rod is useful to lead the gelatine over the plate to those expert in its use, it not being so liable to leave air-

bubbles as a brush; one or the other I am obliged to use. This tissue is very sensitive. Starch paste for mounting, I have found best, at the same time great care must be used; the paper must be well saturated with the paste before applying the tissue.—Your obedient servant,

H. R. Nichols.

2, *St. Jude Street, May 7th*, 1864.

MR. SWAN'S PATENT.

Sir,—Law and physic have been facetiously ranked among the luxuries of civilized life, perhaps, because like luxuries, they are dangerous when intemperately indulged in. The first swallows an estate ere it can see clearly through the title of a stone wall. The last claims a fortune from the unhappy hypochondriac that suffers under a suicidal propensity for pills, potions and nauseating draughts. But these extremes do not destroy the fact, that law and physic under proper treatment are agents of good; the evil only resulting from injudicious indulgence or ignorant misapplication, and seeing that human judgment is prone to err, it behoves all to steer as clear as possible from the reach of either, warding off the first by prudence, the second by temperate observences. But "throwing physic to the dogs," without further preface, allow me to discuss some of the difficulties that surround Mr. Swan in the maintenance of a right which I hold, in point of law, to stand somewhat questionable, and, without doubt, so weak in its outworks, so feeble in argument, to support its claims, that a slight evasion of its details may be practised with impunity.

I proceed first, then, to examine the grounds on which Mr. Swan bases his claim to a patent right, which, if I understand the matter clearly, is in the invention of a certain tissue or film, on which, or with which, the picture is produced.

Analysing this tissue, we find it composed of six substances, that, by classification, may be divided into two parts, the chemical and mechanical; chromate, gelatine, and sugar belonging to the first, and water, collodion, carbon, the latter. Now, were these substances employed by Mr. Swan alone, in the production of carbon prints, then might he reasonably expect to hold a right to legal protection, and the pecuniary benefits which may arise from the sale of licences for the working his invention: but, on examination, we find that no article is used by Mr. Swan in his process, that has not been suggested or employed by others that preceded him, in working over the same field. The peculiar property of gelatine, when combined with a chromic salt, was known to Ponton twenty-five years ago. Printing from the under side of a film, where carbon is employed, is a principle that was recognized by Burnett, so far back as 1858. Fargier, Pouncy, Beattie, and many others have since then practised it. The whole, or part, of the substances before enumerated, having been employed; and last, Mr. Swan who, by a simple modification, arrives at the summit of success. But the question now arises, does a successful application of pre-existing ideas give an exclusive right to their adoption, to the prejudice of those in whose minds the ideas were produced? and also to the prejudice of others who may have accepted those ideas as a basis for experiment? I believe not. Then the claims set forth by Mr. Swan must rest on the "sensitive, pigmented, collodio-gelatine tissue," that, in point fact, cannot be proved an original invention at all, for, on inspection, it will at once be seen that Fargier's process is the same in principle, if not in detail, for had M. Fargier secured his collodion film to paper before immersion in water the invention of Mr. Swan would have been altogether anticipated. What matters it whether the exposure is applied to a film supported by glass or the more pliant collodion? Where the image produced is comparatively latent, or what matter if the collodion be applied prior or subsequent to exposure? The results, in point of fact, is a picture produced on a tissue, so that Mr. Swan has but one solitary prop to sustain the validity of his claims; viz., a tissue on film detached from any rigid supporter, but, nevertheless, a substance precisely identical with that employed by M. Fargier in his game of patience round the water basin. Then, with these facts before me, I repeat Mr. Swan has adopted an ill-advised course in taking, or intending to take out, a patent for a process so void of genuine originality, and so easily modified that he cannot reasonably expect a return at all equivalent to the outlay to be incurred in obtaining and afterwards maintaining the integrity of his patent privileges, more especially as the patent laws are so notoriously imperfect that (to use a popular figurative phrase) "a coach-and-four would pass through them," and if strictly original inventors find it difficult to maintain their rights, how much more difficult will the task prove to support claims that have little or no sustaining advantages? I have been favoured with the opinion of a professional friend who has had large experience in preparing patent specifications, and he unhesitatingly declared a "a very slight modification will be sufficient to enable any one to set the exclusive rights of Mr. Swan at defiance," and I scarce need add those modifications will not fail to suggest themselves to experimentalists so ingeniously fruitful in resources as photographers usually are. Then, I ask, would it be wise, would it be consistent, for Mr. Swan to persevere in obtaining or seeking a right which will ultimately prove "an old man of the sea" to his happiness, if he is inclined to support that right. I believe, and I speak advisedly, when I reply it would not, and in the spirit of honest candour, ask him to pause and consider ere he pursues the matter further.

As a sincere admirer of his persevering ingenuity, I disclaim any motives that approach antagonism, but simply urge the foregoing remarks. Knowing that to be forewarned is to be forearmed, and even admitting his patent right as strictly valid, how unsatisfactory will the scheme of levying a royalty work, as Mr. Swan must of necessity trust to the honour of those who hold a legal licence for the working his process. And what is honour? An empty sound, that oft-times is employed to hush the hissing breath of knavery. Daily experience proves that black sheep may exist in every flock, and I see no reason why photography should prove an exception to the general rule. Again, I object to photographic patents on principle. Photographers have proved themselves the most liberal men of science existing; for in no other has there been that free exchange of ideas. When successes have been attained in any of its branches, the particulars have been freely presented to the world. And here we arrive at the root of the gigantic progress that has been effected, and it is a notorious fact, that those who have been anxious to exchange secrets for postage stamps are men who trade on the brains of others, as has been proved by ourselves, for on examining a half-crown's worth of formula, found it to be one of our own construction, which the dupe might have received with many other formulæ, had he studied the contents of his weekly News. And now, in conclusion, in reference to the supposed difficulty of collecting a remunerating sum, for such Mr. Swan is unquestionably entitled to, even for reviving the subject, and pointing out former errors—I point to Mr. Pouncy. No great difficulty was encountered in meeting his demands, and I see no reason why an equal readiness would not be exhibited in the case in question. My mite is at his disposal, and, I doubt not, numbers would be willing to adopt the same course—having freely received, they would as freely give.

I have tendered my views, hoping that others may follow suit. From multiplicity of counsel, a store of wisdom might sometimes be gleaned. A Photographer's Assistant.

[We are in no wise concerned to become Mr. Swan's advocate, or to defend his right to a patent; but we may suggest a few considerations which our esteemed correspondent has either overlooked, or to which he has not given due weight. In the first place it is very difficult to discuss Mr. Swan's right to a patent, without knowing what he patents, and that cannot be known until his specification is published. In the next place it is an error to suppose that Mr. Swan's patent can in any way prejudice the right of photographers to use all the other known processes with the same materials. His patent can only protect him in the use of his method. All the same materials may still be used in any way which can be devised to give success, except that which Mr. Swan has originated. That he has originated something it is clear, inasmuch as he has produced, and enabled others to produce, results such as the photographic world had not seen before. The especial point which gives this power is new, and is Mr. Swan's. What it is, his patent will specially state, we are not called upon to define it. Having regard to the history of the past, we feel very sure that Mr. Swan would not accept, as a voluntary contribution, or reward, what he could not claim as a right. The patent laws are very imperfect, and beset with difficulties; but, we apprehend, the proposed mode of collecting the royalty will be very simple and efficient, leaving nothing to honour; and, unless it can be shown that the same method and the same results have existed before, we think that no honest man will attempt to evade the payment of such an insignificant royalty.—Ed.]

Sir,—The present age assumes to itself a superior position in relation to the past. I fear there is much self-gratulation on this point; we reasonably lament the decadence of high-class individualism in our legislators. Our great men, where are they? Shakespeare, Newton, Stephenson, Peel, and Wellington. They are gone! has their inspiring mantle fallen upon those who fill their places? I fear not. In times past, there was a noble class of intellect, whose love of truth and pure progression impelled them to become the impartial advocates of individual rights, whether in science, art, or politics. Alas! for the present age, men are so entangled with their self-importance, that they have become incapable of appreciating the qualities of any developed fact, beyond their own individuality; hence, when a desideratum has been supplied, and the persevering discoverer introduces it to public view, the tendency of the age is to "cry it down."

Your pages give ample proof of this, in the case of Mr. Swan, who presents to the world an accomplished fact of surpassing importance. Photography is now in the prime of life, and for twenty-five years the intellect of the world has been struggling in vain to produce a photographic picture which should be everlasting, and, at the same time, be unimpeachable in quality. Mr. Swan is the first and the only man who has shown such a picture to the world; and is it not lamentable to read in your pages the ungraceful assaults levelled against his fair fame? From every point of the compass spring up claimants to the various planks in his victorious craft.

Seriously, this is a most dangerous and anti-progressive system, and if allowed to continue, will eventually root up all that inherent and motive power which propels men against the current, who, aiming high, penetrate the unexplored regions of nature with the laudable and holy object of being able to leave the world better than they found it—of adding new pleasures to the circumstances of life—of more amply expounding the vastness of creation and the glory and power of its Creator.

Let us, then, with all manliness, throw aside self-consideration, and with one voice join in thanks to those noble-minded pioneers of photography that have helped it forward to its present high position—Talbot, Daguerre, Ponton, Archer, and Swan. These names are associated with processes producing perfect pictures. I place all others in the distance until they show us a perfect photograph.

I had almost forgotten to mention on my own behalf (the above strictures, to the contrary, notwithstanding) that the method described by Mr. Swan, in your last issue, for transferring negative films on glycero-gelatine plates has been fully described by me in last year's News. I was the first to propose this very valuable material, and as it is destined to figure most prominently in many branches of the photographic printing art, I naturally feel a solicitude for preserving my claims to the paternity of my own proper offspring. Joseph Lewis.

[Mr. Lewis's communication, first describing the use of gelatine and glycerine as a tissue for the transfer of negatives, appeared on page 383 of our last volume. We have pointed this out to Mr. Swan, who had not seen it. It must be borne in mind, however, that in describing his method of transferring negatives, Mr. Swan claimed no discovery. He merely, in answer to inquiries, described in detail the method he used to get negatives capable of giving non-reversed images on his new tissue. We fear the tendency to dispute the claims of benefactors to mankind is not peculiar to this age; it is as old as human nature.—Ed.]

Photographic Notes and Queries.

Washing Prints.

Sir,—I think that it is of importance in washing prints that the water should enter at the bottom of the vessel and rise for the overflow, as by this method the prints are, by the action of the water, kept from sticking close together. I have an arrangement on this plan, very simple in itself and easy to get made. It consists of a tub with a tube running down the outer side to conduct the water from the tap to the bottom, where it rises through a perforated false bottom. The overflow is, by a number of small holes bored a few inches from the top. By this contrivance the prints never get washed over the rim of the vessel. If approved of, there may be several lots of prints in the same tub, separated by as many perforated false bottoms. There is also a tap in the side for drawing off the water when the proofs are sufficiently washed.—I am, sir, yours respectfully,

James John Maginn.

Manchester, May 4th, 1864.

Talk in the Studio.

Photographs by Artificial Light.—At the Society of Arts, on Thursday evening, Dr. Crace Calvert, F.R.S., in the concluding lecture of his course of Cantor lectures, called attention to the metal magnesium, exhibited specimens of wire made from it, and showed the brilliant light which its combustion affords. This light is so intense, and possesses to so great a degree the qualities of sun-light, that photographs can readily be taken of objects illuminated by it. At the conclusion of the lecture several successful photographs were taken in 30 seconds by Mr. Claudet, of Theed's bust of the Prince Consort, in the ante-room of the society's lecture hall, the first ever taken in London by means of this illuminating agent, and they elicited considerable interest among the audience.—*Times*. [There is a slight error here. The first photograph taken in London by this light was produced a month ago, at the South London Photographic Society, by Mr. Hart; a print of the negative is now in our possession. On Friday evening last Mr. Brothers produced an admirable portrait of Professor Faraday, at the Royal Institution, by this light. We shall publish further details of this experiment in our next.—Ed.]

Glass Paper Clips.—We are requested to state that the glass paper clips which we noticed in our last as a great improvement upon those of wood, are the invention of Mr. Donald McNicoll, who is now manufacturing them for general use.

Novel Use of Photographs.—The police of Berlin have just made an application of photography, which promises to be useful. They procure a photograph of any person who has been murdered and mount it on a large black ground, and this is mounted again in the middle of a large red poster, which is widely circulated, inviting all persons who have seen the original about the time of the murder, to communicate with the authorities. By this means, the latest information as to the whereabouts and company of the victim is easily obtained.

The Constitution of the Solar Atmosphere.—According to Kirchoff, the great spectrum analyzer, the evidence of the existence of potassium in the solar atmosphere has broken down under closer examination, but additional evidence has been obtained of the existence therein of iron, nickel, barium, copper, zinc, strontium, cadmium, &c., and that no additional elements have been found in the sun.

To Correspondents.

J. Beldon.—The prints you enclosed were altogether worthless as specimens, except, as you suggest, as examples of what to avoid. But you will see on a moment's reflection that we can have no more control over the quality of specimens advertised in our pages, than we can have over the quality of lenses or chemicals announced in the same place. If the lenses manufactured by Mr. A, or the collodion prepared by Mr. B, should not in your hands turn out all that the respective makers proclaimed them to be, you would not dream of taxing us with indiscretion for inserting the advertisements of Mr. A or Mr. B. Personally, we have no concern with the advertising department; but we put the case of that department when we point out that if a censorship of the advertisements were established, and no announcement were allowed to appear in regard to which we had not previously made such inquiries as enabled us to endorse it, would be simply impossible to conduct the business at all. If we established this censorship in one instance, why not in all? Where could the line be drawn? In allowing answers to advertisements to be addressed to the office, our publisher never intends to assume the slightest responsibility. He knows nothing of either advertisers or those who may reply. The matter is simply one of convenience. He would be very sorry to aid in any transaction unfair to our readers. We can only suggest to our readers, that they use prudence in judging of the truth of statements made in advertisements; for, apart from any intentional dishonesty, every producer is liable to over-

estimate his own goods. In the case in question, we think the price should indicate that the specimens were not likely to be of very high class which were sold for twopence or threepence apiece. We have forwarded the specimens in the envelope in your second letter, and trust that the issue may be more to your satisfaction.

Henry Thompson.—In dispensing with alcohol in the developer, the condition of the nitrate bath must, of course, be taken into account, as, if the bath be very old, it is more difficult. 2. The mode of getting a developer to flow evenly, without driving off the free nitrate by running on the edge of the plate, and that with little or no alcohol, cannot be very well described, inasmuch as it depends largely on the knack of manipulation. The solution is poured along one edge of the plate by a quick and steady motion, without any jerking, and at the same moment, by a dexterous turn of the wrist and hard holding the plate, the wave is made to flow steadily and evenly over the whole surface of the plate. 3. Litmus paper may be used to test the toning solution. When a toning bath has become inert, it is often difficult to get it to work again. Sometimes the addition of hydrochloric acid, and then the addition of a little carbonate of soda to neutralize, will start the action. Sometimes the addition of a little chloride of lime will start the action. When these, and the addition of fresh chloride of gold fail, it is best to precipitate, and recover the gold. 4. Instantaneous photography simply depends upon good material and good light. A good bromo-iodized collodion, a nitrate neutral or slightly acid with nitric acid, a good lens, and good light, are necessary. The good light especially. Your No. 2 B will be very much quicker than your triple, and most suitable for the purpose. It may be used with a 5 by 4 plate. The triple will cover a larger plate, but, except in very bright light, you must not expect an instantaneous picture with it. Use a strong iron developer. 5. In order to get instantaneous pictures on the very best of dry plates, you must have a very good light, and lenses of short focus used with wide aperture. 6. We will address the letter, if you forward it to us. Your pictures show the effect of a little too much front light, and a little over-intensifying.

F. K.—There is no efficient mode of quickening the action of your chemicals, except keeping them pure and in good condition, and your failure is more probably due to some defect in the illumination of the sitter than to the chemicals. Of course, if your collodion be old and red, it may be slow; if the nitrate bath be weak, and have excess of acid, it may cause insensitiveness; if your developer be old, it may render necessary long exposure; but it is most probable that, from some defect in the construction of your glass-room, your sitters are not well lighted.

Silver Nitrate.—Silver coin contains a trace of copper, and hence the colour of your crystals, which is due to the presence of nitrate of copper For printing purposes, and even, so far as we know, for the negative bath this nitrate of copper will not be injurious; but if you wish to get rid of it, there are various methods. Perhaps the simplest is to dissolve the discoloured nitrate in distilled water, and boil it; then, whilst hot, add a little caustic potash, which will precipitate the copper as an oxide.

P. S.—There is no reason why a bath treated after Mr. Gage's method, with carbonate of soda and then re-dissolved, should injure the film, unless you have too much nitric acid present. Test your bath with litmus paper and ascertain.

An Amateur takes exception to the statements of a recent letter in our columns, by Mr. Barton, to the effect that:—"Some of the worst photographers charge the highest prices, while occasionally skilful men charge very low," and that it appears to "depend as much on the situation selected, and the amount of impudence possessed, as on any question of skill." "Amateur" adds, "Now, everyone who is not foolish knows the contrary to be the case. It is the first time I ever heard that incompetency and impudence were qualities conducive to success, in a pecuniary point of view, in the profession of photography." After some personal comments, which we cannot insert, our correspondent adds:—"Those who are willing to pay high prices are generally good judges, and nothing but superior ability and polite behaviour will command, for any length of time, a prosperous amount of patronage." "Amateur" then again returns to personalties altogether unjustified by Mr. Barton's letter, and which it is unnecessary to publish.

Haverfordwest.—The causes of the developing solution rapidly turning turbid after it is applied to the plate are various; sometimes it will arise from a want of acid in the developer; sometimes from the nitrate bath being contaminated with organic matter, and sometimes from other causes. 2. The prints losing tone, and becoming poor and red in the hypo, may proceed from various causes: the paper is sometimes at fault, the toning bath is often at fault, especially when carbonate of soda is used, and the bath is used soon after mixing; the action appears rapid, and a deep tone is quickly obtained, which is, however, factitious, being the result of the action of disengaged chlorine rather than of a deposit of gold. Prints so toned generally become brown in the hypo. Prints from weak negatives, which do not admit of very deep printing, are very prone to the same defect. 3. In regard to the development of large plates, so as to avoid stains, it is rather a matter depending upon skill in manipulating, arising out of practice than anything else. Use a weak developer, and plenty of acetic acid. For dark tints, see our advertising pages, and occasional notices.

Enquirer.—Astigmatism, or astigmation, is a defect frequently produced in portrait lenses in endeavouring to secure a flat field. The effect is, that on the margin of the picture a point in the object to be taken becomes elongated and represented by a line. To explain the optical law on which it depends, and enter into detail as to the result, would require more space than we can devote to it here.

Beginner.—It will be difficult to give you in this column all the recipes required in producing glass positives, but we shall have pleasure in giving all the aid and advice we can, if you will point out where you fail. About a pint of nitrate bath is sufficient for a beginner working small plates. This should contain 1½ ounce of nitrate of silver, 2 grains of iodide of potassium (or ½ ounce of iodized collodion will do), 10 drops of nitric acid, and 1 pint of distilled water. Before adding the nitric acid, let the solution stand in the sun a few hours, then filter, then add the acid. Get a good sample of positive collodion. Clean the plates very carefully. Let the coated plate remain two or three minutes in the bath. Do not expose too long. Develop with protosulphate of iron, 20 grains; acetic acid, 20 drops; nitric acid, 2 drops; water, 1 ounce; wash carefully and apply the cyanide. You will find the instructions in our Year Book valuable. Let us have detailed descriptions of your troubles from time to time, and a little patience, with your perseverance, must secure success.

W. J. J. W.—Opinions are much divided as to the quickest dry process. The various modifications of the tannin process appear to give, on the whole, the best result. That mentioned by "Jex," in a recent letter, was accompanied by a photograph, as nearly as possible instantaneous, as an illustration of the capabilities of the process. We apprehend that any freely bromized collodion would answer, but from the description given by "Jex," it is probable he used the formula of M. Jeanrenaud, given on page 111 of our last volume. You will find details of working the solar camera on pp. 247 and 253 of our 5th volume, Nos. 142 and 143. The developing solution is simply a saturated solution of gallic acid, with a few drops of silver solution added, if necessary. You will find Col. Stuart Wortley's formula for the tannin process on p. 278 of our 6th volume.

No. 1 Operator.—Probably having strengthened your bath, without having added any iodide, it dissolved the iodide out of the film on your plate. Leave a coated plate in for a few hours, and then let us know the result.

Chinese.—If we remember rightly, the series of photographs to which you refer were produced by Signor Beatti, and published by Hering, of Regent Street.

Nassau Jocelyn.—If a gelatine sub-film be used, it will, doubtless, be best to use acetic acid in the bath, but under other circumstances nitric acid may be used with advantage. Col. Stuart Wortley used it freely in his bath in preparing his tannin plates, with which some of the finest and most rapid Italian views were taken. 2. Acetic is very difficult to eliminate from a bath, as any attempt to neutralize it forms acetate of silver. Adding an excess of alkali, and sunning, has been recommended as reducing the organic silver salt formed, but we have not tried it. 3. The plentiful use of bromine, sufficient exposure, and careful and slow development, are the most likely aids to securing all the delicate tone in glacier scenery with tannin plates. We shall be glad to hear of your experiences.

Argent.—If you have obtained your negative of any public building, &c., you do not require the permission of anyone to register it, unless you took it as a commission, in which case the copyright is not yours, without an agreement in writing to that effect with the person employing you. If you took the photograph on your own account, the copyright becomes yours without further arrangement; but if it was taken by the instruction of some one else, the agreement is necessary, and then a registration of that agreement must be effected before selling copies.

John Cockin.—You do not state the nature of the application of the water-wheel in washing. Mr. Williams has applied the principle in the machine recently described in our pages, the cylinder containing his prints being formed like the wheel and turned by a small stream from a tap.

J. C. S.—Mr. Bedford's address is Carlton Villas, Camden Road; Mr. England's, St. James' Square, Notting Hill. We believe that Smith, Beck, and Beck publish Warren Dela Rue's astronomical photographs.

Stereo.—We shall have pleasure in aiding you with our advice, if you will indicate names by figures, as we cannot use names without making invidious distinctions.

L. C.—An operator will not necessarily know anything whatever of the management of a business, but there are, doubtless, assistants to be obtained who can undertake the latter department. The duties to be performed, the rate of remuneration, the term of engagement, and hours of work, are generally the subjects of special agreement, no general law prevailing. You would find a consultation with a respectable photographer in business of more value than any advice we can give you in these columns on this part of the subject.

J. F. O.—The defect you describe is most probably due to some peculiarity in the pyroxyline with which your collodion is made. Some samples are partially soluble in alcohol, and hence the tendency to be marked where the flow of the varnish pauses. The redness of the image, probably, proceeds from the same cause.

N.—We have forwarded your letter. We may add, however, that Mr. Law states, in another letter we have received, that on trying a commercial sample of the double sulphate, he has met with results similar to your own; so it appears that, in preparing the commercial article, something is eliminated which, by Mr. Law's method, is retained, and which is important in obtaining good results.

Several articles and letters on Mr. Swan's process, and other subjects, are compelled to stand over until our next.

Several correspondents in our next.

Several advertisements intended for the present Number are compelled to stand over.

Photographs Registered during the Past Week.

Mr. Josiah Gaoom, Wyle Cop, Shrewsbury,
Two Photographs of the late Major Owen, of Condover Hall, near Shrewsbury.

Mr. W. Widger, 44, Union Street, Torquay,
Two Photographs of Wm. Pengelly, Esq., F.R.S., &c.

Mr. Henry Lambert, 10, Fountain Buildings, Bath,
Two Photographs of Rev. J. Fleming.
Photograph of Rev. Hill.
Photograph of Rev. Cavill.
Photograph of Rev. Crowder.
Photograph of Rev. Jeckell.
Photograph of Rev. E. Wynne.

Mr Wm. Wallis, 102, Snargate Street, Dover,
Photograph of Rev. M. Lupton.
Photograph of Eight Methodist Ministers.

Mr. Wm. Wilby Law, 49, Gold Street, Northampton,
Photograph of the New Town Hall, Northampton.

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth,
Photograph of Rev. Blathwayt.
Photograph of Rev. Hale.
Photograph of Torrens McCullogh.
Photograph of late Father Gavazzi.
Photograph of Captain Gooch, R.M.
Photograph of Rev. Thomas Preston.
Photograph of A. Deffongerais, French Consul.
Photograph of Colonel Astley.
Photograph of Rev. L. Worship, Stokesley, Norwich

Mr. John Stuart, 120, Buchanan Street, Glasgow,
Photograph of Rev. J. Logan.
Two Photographs of Rev. M. Rodger.
Three Photographs of Rev. Wm. Munsie.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 298.—*May* 20, 1864.

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PHOTOGRAPHS BY THE MAGNESIUM LIGHT.

The value for photographic purposes of the light afforded by the combustion of magnesium appears by a multitude of experiments to have been fully established, and as the demand for the metal becomes greater and more certain, it is probable that the supply will be more plentiful and regular and the price cheaper. The enormous cost of the wire until recently has probably been the sole reason why photographers have not earlier become practically familiar with the highly actinic character of the light evolved by its combustion. The attention of photographers was first called to the subject in our own pages by Mr. Crookes, at that time Editor of the PHOTOGRAPHIC NEWS, who stated in October, 1859, that he had been for some time experimenting with the magnesium light with a view to its application to photographic purposes. In the "Philosophical Transactions," published at the end of the same year, a Memoir by Professors Roscoe and Bunsen also called attention to the chemical qualities of the light. Since the first mention of it in our pages we have kept the subject before our readers until the present time, when the increased supply of the wire, and the experiments of various photographers have placed the application amongst recognized photographic facts.

To Mr. Brothers, of Manchester, belongs the credit of producing the first portraits by the magnesium light, and of working the matter out to an issue of complete success, of which perhaps the experiments at the Royal Institution, on the evening of Friday, the 6th inst., was the most interesting illustration, when, during a lecture on Spectrum Analysis, and the new metal Indium, the subject of the magnesium light was introduced. Mr. Brothers then proceeded to take a photograph of Professor Faraday, before the audience, and succeeded in producing as fine a portrait of the venerable *savant* as we have seen, the picture possessing softness, delicacy, roundness, and modelling in a marked degree, and being in no wise inferior to the majority of portraits taken with sunlight, in a glass room, with all appurtenances and means to boot. The amount of wire burnt was about twenty grains, which at the present price of the metal is something less than one shilling's worth. The negative was at once dried and varnished, and a dry tannin plate being exposed under it to the light given by the combustion of about one-third of a grain of the wire, was developed and completed as an excellent transparency, the image from which was projected on a screen by the aid of the magic lantern and the oxyhydrogen light, and exhibited to the astonished audience in twenty minutes from the period when the negative was taken. A photograph of Sir Henry Holland, taken immediately before the lecture, is equally soft and well modelled.

A series of eight photographs before us possesses considerable interest, as including the first pictures taken by this light. The first is a copy of an engraving, produced by the combustion of about fourteen grains of the wire, the result differing very slightly from one taken by daylight with the same lens, the same materials, and the same exposure; the difference being altogether in favour of that produced by the artificial light, which is more perfectly exposed and more brilliant. The next is a very brilliant portrait of Professor Roscoe, quite undistinguishable from one produced in the glass room by the solar light. The two next are very interesting illustrations of an important application of this light. They consist of portraits from sculptured busts of the late Dr. Henry, and Mr. Hodgkinson, taken in their places in the rooms of the Literary and Philosophical Society of Manchester. The niches in which these busts are placed are so secluded from solar light as to render the photographing them without removal simply out of the question; and as they, in common with many sculptures, could not be removed, photographs of them became impossible without the aid of such a light as photographers now possess in magnesium. Many of the noble monumental sculptures in English and Continental churches and cathedrals, as well as interiors of the buildings themselves, now become accessible to the art of the photographer, which have hitherto been beyond the pale of photography.

The plan adopted by Mr. Brothers for illuminating the model, appears to have been very successful. In estimating the exposure, he has been guided rather by the amount of wire burnt than the time occupied in burning it, as the time is of course regulated by the thickness of the wire, and would thus form an uncertain datum. A given weight of wire, however, will yield a certain illumination, whether burnt in a thick wire or a thin one, in one piece for a minute, or in four pieces ignited at the same time, each burning a quarter of a minute. The chief portion of the wire to be burnt is held, when ignited, at a distance of a few feet from the head of the sitter, a little above and a little to one side, being moved gently about to diffuse the illumination and prevent the too concentrated effect, which a light from a single point has a tendency to give. A small portion of the wire is burnt by an assistant at the opposite side, just giving sufficient light to throw detail into the shadows. If an equal amount were burnt at each side, the shadows would be neutralized, and an effect of great weakness and insipidity would follow.

It is very important that the light should be so screened as not to reach the lens. In order to effect this, Mr. Brothers has used a contrivance not unlike a common tin dust-pan, such as housemaids use. This screen or shield is made of tin, about twelve inches deep, twelve wide at the bottom, and six wide at the top, with the lower portion so curved as to receive the ash of the wire as it falls, which, otherwise, retaining the flame as it drops, throws a light into the camera. Attached to the screen is a handle passing through a piece of wood, something like the guard to a small sword, and attached to this

is an American clip holding the wire, which is slightly bent, following the curve of the shield. This latter, whilst it screens the lens from the light also acts as a reflector, aiding to throw the light on the model, and, by a slight inclination of the reflectors direct the light to different portions requiring especial illumination.

The various applications of this light will readily suggest themselves to photographers. Whilst portraiture by artificial light may possibly not be one of the most common of these applications, it is by no means an unimportant one. Invalids, for instance, who cannot leave their own rooms may now be readily photographed, the products of combustion being so entirely innocuous that no hesitation need be felt in burning this wire in an apartment. Statuary in unlighted positions, as we have already remarked, is admirably illuminated by this light, the concentrated character of which, and the cast shadows produced, is admirably suited for the effective delineation of sculpture. The examples of Mr. Brothers admirably show this, and the more recent pictures of Mr. Claudet, at the Society of Arts, illustrate, we understand, the same fact. Interiors, tunnels, before impossible to photograph, now become simple affairs, solar camera reproductions and enlargements, and a variety of other subjects, suggest fields in which the photographer may now dispense with his hitherto imperative ally, the sun.

ARE CARBON PRINTS PERMANENT?

The question has been asked repeatedly of late, "Are carbon prints really permanent?" One of our correspondents states that he thinks their permanency has been too much taken for granted. He revives an old argument, and states that as the carbon is held by a perishable material—gelatine—and that as both are attached to paper by a perishable cement, such as glue or paste, the term permanent is not justifiable.

We remember, that some years ago, when carbon prints were first talked of, the same argument was used, and it was proposed by one writer to submit them to a solution of caustic potash or of chloride of lime, in order to test their permanency. This on the assumption, we presume, that if the organic basis was thus dissolved, and the picture removed, the permanency was disproved. A very little reflection will show that these arguments or experiments prove nothing to the purpose. That the pictures should be removed by such treatment merely proves that they are destructible, and has no real reference to their permanency. An oil painting might be destroyed by a similar process, but no one dreams of regarding oil painting as wanting in permanency. The paper itself upon which a picture is produced may be destroyed, but the permanency of the picture is not to be impeached on that account. The reproach of photographs has been that they often contained within themselves the elements of destruction or change, or that when subjected to the action of the atmosphere with the gases it generally contains, they lost their beauty or faded altogether. The real question of importance, then, will take this form, "Are carbon prints liable to change or fade under the ordinary circumstances in which such things are kept, as silver prints have been?" When the question is thus put it admits of a very easy answer in the negative. It is unnecessary to dwell here on the permanency of carbon itself; the photographer can, moreover, by using other pigments to vary the tint of the picture, obtain just the same certainty as the painter by taking heed to select permanent colours. The vehicle in which the pigment is held imprisoned, although perishable in itself, becomes, by the action of light and chromic acid, changed in character and converted into a material very analogous to leather, and altogether impervious to any cause of destruction to which the picture has any right to be subjected. As for the perishable character of the mounting material, the carbon print stands in just the same relation as regards permanency as any other mounted picture. How far the surface of Mr. Swan's pictures may bear abrasion, or how soon the mechanical difficulties of mounting, no[ble], somewhat troublesome, may be overcome, we cannot at th[is] moment say, but we see nothing whatever, at present, either in the materials used, or the manipulations necessary, [ex]pressly suggest the slightest want of permanency or durability in prints by Mr. Swan's process.

MR. SWAN'S PROCESS AND THE PRINTING PRESS.

Some twelve months, ago Mr. George Wallis, of the Science and Art Department, South Kensington Museum, described a process at the Society of Arts, and afterwards at the South London Photographic Society, by which he had discovered that a metal plate, with an intaglio image proper for printing at the copper-plate printing press, might be produced by pressure from a drawing made with a suitable ink. This ink consisted of "peroxide of tin, peroxide of manganese, Indian or Venetian red, Paris white, rice starch, gum arabic and bichromate of ammonia." The drawings made in this ink had a certain amount of relief, sufficient, when a proper pressure was applied with a rolling press constructed for the purpose, to form an intaglio image on a plate of Britannia metal. These plates would, with care, print a fair number of impressions, and by the application of M. Joubert's process of acierage might be made to yield any required number of prints.

The question now arises, whether the ingredients necessary to give a sufficiently hard surface, used in Mr. Wallis's ink, might not be incorporated with gelatine, instead of the pigment used in Mr. Swan's process; and, as the image formed is in very decided relief, the deep shadows standing up like the ink on a good etching, whether a plate with an image in intaglio, capable of giving prints at a copper-plate press, might not be produced by a process similar to that of Mr. Wallis. If in Mr. Wallis's a certain effect of half-tone could be obtained, and the effect of a wash or flat tint, rendered in the print, as unquestionably was the case in some of the specimens we saw, we see no reason why at least an approximation to a photographic half-tone might not be also obtained by using photographs produced by such a modification of Mr. Swan's process as we have indicated. Mr. Wallis's process is patented; nevertheless, we commend the suggestion to those of our readers inclined to experiment in that direction, and also more specifically to Mr. Wallis himself.

In referring to Mr. Swan's process and the printing press, we may here place on record the fact that we have received from Mr. Swan a print from a metal plate produced by photography, with a considerable amount of half-tone and a promise of still better results. This print is simply sent for our personal inspection, and we now merely record the fact, as one of photographic interest, for future reference.

DRY COLLODION WITH RESIN.

BY M. L'ABBE DESPRATS.

It has occurred to us that the time has arrived when we might add some new development to our recent article on dry collodion. In seeing so many methods proposed for operating with dry collodion, we have thought that upon this delicate point an entire confidence in the efficacy of the means proposed would be difficult to establish. Nevertheless, as upon this point our personal conviction was as complete as possible, we think that it will be good to still further legitimise our previous assertions by describing the modifications which numerous experiments have suggested to us.

The number and importance of the facts we have to note will necessarily render this description rather long, and we must anticipate the reader's excuse for our prolixity, but we shall at the same time be as didactic as possible. We also venture to hope that the frankness of our communication will determine some earnest experimenters to repeat our trials. Success cannot be doubtful; it will be sufficient for

them to place themselves in the same position as ourselves. In expressing ourselves in this manner we have no fear of being contradicted. We are desirous of provoking discussion, being persuaded that our replies will turn to the public advantage, for whom we have always laboured.

Of the Collodion.—It is perhaps preferable, but not necessary, to first dissolve the resin in the alcohol which forms part of the collodion. The choice of the resin is a matter of indifference, we have tried several varieties with equal success. We believe, however, that black resin works better than the yellow. Benzoin is also excellent. By the moist method a simple decantation, after settling eight days, will be sufficient to obtain a clear collodion. For the dry method, filtering is absolutely necessary. The reason for this is very plain. By the moist method, the various atoms of impurity have not time to manifest their presence by their reaction upon the iodo-nitrate of the collodion film; it is not so in the case of dry collodion. The disturbing action perseveres, and extending itself freely reveals itself by black spots or white aureolæ, in the centre of which an opaque point is frequently visible. These impurities do not always exist to the same degree in all collodions. Those with iodide of cadmium contain the most. Collodion iodized with iodide of potassium gives, on the contrary, a very pure film, by simple decantation. It is to be regretted, on the other hand, that this collodion, which, besides, gives a very adherent film, is relatively slow and of a very uncertain preparation, on account of the slight solubility of the iodide in alcohol. It is with difficulty that alcohol at 36° dissolves the requisite quantity. We must then take the weakest alcohol, or rather dissolve the iodide of potassium in as little water as possible. This done, the preparation will be easy, but on account of the water it contains it will not be good for use until it has been made several months.

The thickness of the film furnished by each collodion must be taken into serious consideration. The thinner it is the greater its resistance in the baths, or, to speak more strictly, the better it will adhere to the glass plate. The quantity of plain collodion deposited upon the surface of the plate should be just sufficient to contain the quantity of the iodide necessary to the production of the image. A proportion of alcohol relatively strong seems to us admissible for dry collodion. Instead of 30 per 100, there will be an advantage, especially in summer, in taking 40 parts of alcohol and 60 parts of ether, the first at 36° and the second at 54°. These strengths are quite sufficient.

The collodion being poured upon the plate held at one corner, it is then left on a tripod to repose, until the last drop has drained off at the lower corner of the plate; it must be left for a minute at least. At the end of this time the collodion is generally set. Experience will show if this time must be abridged, especially in summer. A plate kept too long after the collodion has set, loses the film in the silver bath.

Sensitizing Bath.—A new bath, or one that has been used but very little, is necessary for dry collodion. It may be either neutral or acidulated with acetic acid; we prefer it neutral, because it is more sensitive. A bath of 6 to 8 per cent. will suffice. It will be necessary to keep a large reserve in the supply bottle; the results will thus be guaranteed for some time; this observation is of the highest importance. With an old bath, giving excellent results by the wet process, it will be impossible to obtain a good result by the dry. There appears to us no sort of doubt that the mixture of alcohol and ether, contained abundantly in the old bath, is capable of dissolving a portion of the light pellicle of the iodized collodion that must form the picture. This film, if we operate by the moist way, must, we conceive, remain adherent at the same time as the alcohol and ether; but in operating by the dry method, it cannot be the same. The washing waters partly remove this film, and only irregular pellicles remain, resting upon a nearly inert film of collodion.

The bath must therefore be carefully watched in proportion as it is used. Thus, every time it is poured back into the supply bottle we must examine how the bottom of the dish drained, and submitted to a washing in pure water behaves. If the water has much difficulty in spreading and mixing with what remains of the bath, the bath must be given up; it contains too much alcohol and ether. To restore its good qualities, it must be completely evaporated, not only till we obtain a dry residue, but, further, the action of the heat must be carried up to fusing the nitrate of silver. It is only at this price that the bath will recover its primitive sensitiveness. A simple desiccation may render it apt, it is true, to the operations of the dry method, but the sensitiveness will be greatly diminished.

The collodioned plate may remain two minutes in the bath, left one minute at rest, and then for another minute lifted up and down for the bath to well moisten the film. At this moment, the plate being laid upon a drinking glass to drain for a few seconds, we can, without further delay, proceed to the washing of the film, which can be performed after an interval of about three minutes. It is well known that the plate, on removal from the sensitizing bath, must not be exposed long to the air: the sensibility is also enfeebled under the water, so long as the nitrate of silver is not removed by a persistent washing. Then the plate being promptly deposited in a flat-bottomed dish, it is covered with pure water to the depth of half an inch, the collodion film uppermost. The plate must be balanced slightly in every direction for a minute, the water is then poured off, and renewed, and lastly, at the end of the third minute, the water is renewed for the third time, and the washing is nearly completed, it only remains to lift the plate by means of a hook, and a stream of pure water is poured over the plate. It is then placed to drain by a corner in a clean glass tumbler; it will also be prudent not to touch the plate except by protecting the fingers with well sized paper. After four or five minutes, the plate being completely drained, it will be finally dried over some live coals, partially covered with cinders. Thus dried, it will keep good for several weeks, and moreover, the film will become solid enough to resist the subsequent washings.

The duration of the exposure in the camera, as we have already several times explained, is the same as with wet collodion. This is a fact fully demonstrated with the same degree of light, the exposure is the same in the dry method. This rule has guided us very frequently. It will, however, be possible, and sometimes advantageous, in view of the facility of manipulation, to exaggerate the exposure a little. On developing the picture the operator will be astonished at the facility with which all the details come out in their proper strength, without any part being solarized. This, even, in using a collodion now held in little favour, that sensitized with iodide of potassium, which, in truth, very often in the wet method, leaves much to be desired, it will be possible, by the dry method, to obtain a delicacy of detail and fine half-tones, such as can only be obtained in the wet method by the best iodo-bromidized collodions.

(To be continued.)

A DESCRIPTION OF A PHOTOHELIOGRAPH

CONSTRUCTED BY ORDER OF THE RUSSIAN GOVERNMENT FOR THE OBSERVATORY AT WILNA, UNDER THE DIRECTION OF MR. WARREN DE LA RUE.

BY J. H. DALLMEYER.*

The photoheliograph consists of a telescope with object glass, eye-piece, and camera, mounted equatorially.

Figure 1 represents the equatorial mounting. N O is a pedestal of cast iron, the transverse section of which resembles the letter Y, the angles being strengthened by several horizontal webs. The base of the pedestal, not shown in the

* Read at the London Photographic Society, May 3.

sketch, has a considerable spread. Upon its summit, terminating in a horizontal triangular plane, rests the gnomen X Q R, which supports the polar axis.

The adjustments for latitude and azimuth are obtained by the screws *p p* and *n*. The polar axis S, of hard bell-metal, has its upper bearing in Y's formed on the top of the gnomen, the friction being relieved by two rollers, acted upon by the adjustable spring levers *d*, *e*, *f*. The lower part of the polar axis terminates in a steel point, which rests on the polished face of a steel pivot, freely sliding in a socket, and supported by a spring from below.

The right ascension circle, U, is loose upon the polar axis, to which it can be attached by the endless screw *h*, mounted upon the bracket V, part of the polar axis, and can be thrown in and out of gear by the eccentric Z.

The right ascension circle has two verniers, the lower one fixed to the gnomen immoveable: the upper one attached to, and moving with, the polar axis, the circle being divided on both edges. The first indicates sidereal time, and the second the right ascension of the star observed. By this arrangement, first introduced by the present Astronomer Royal, objects can be found without computation.

Immediately below the divisions, the edge of the circle is ratched and is driven by the endless screw *g*, which being mounted upon the slide T, part of a rectilinear slide, can be thrown in and out of gear by the eccentric *m*. The other movement afforded by the slide serves to correct slight errors in the rate of clock, without deranging the previous adjustment of verniers.

M D represent the clock, regulated by a friction break, influenced by a double conical pendulum. A going barrel, or maintaining power, prevents the clock from stopping when it is being wound up. The weight of the clock descends down the acute angle of the pedestal, and nearly in the centre of gravity of the mass. The clock movement is communicated to the endless screw *g* by toothed wheels. On the upper end *y* of the polar axis S is fastened the cradle C, which carries the declination axis G, made of brass, cylindrical and resting on Y's formed

Fig. 1.

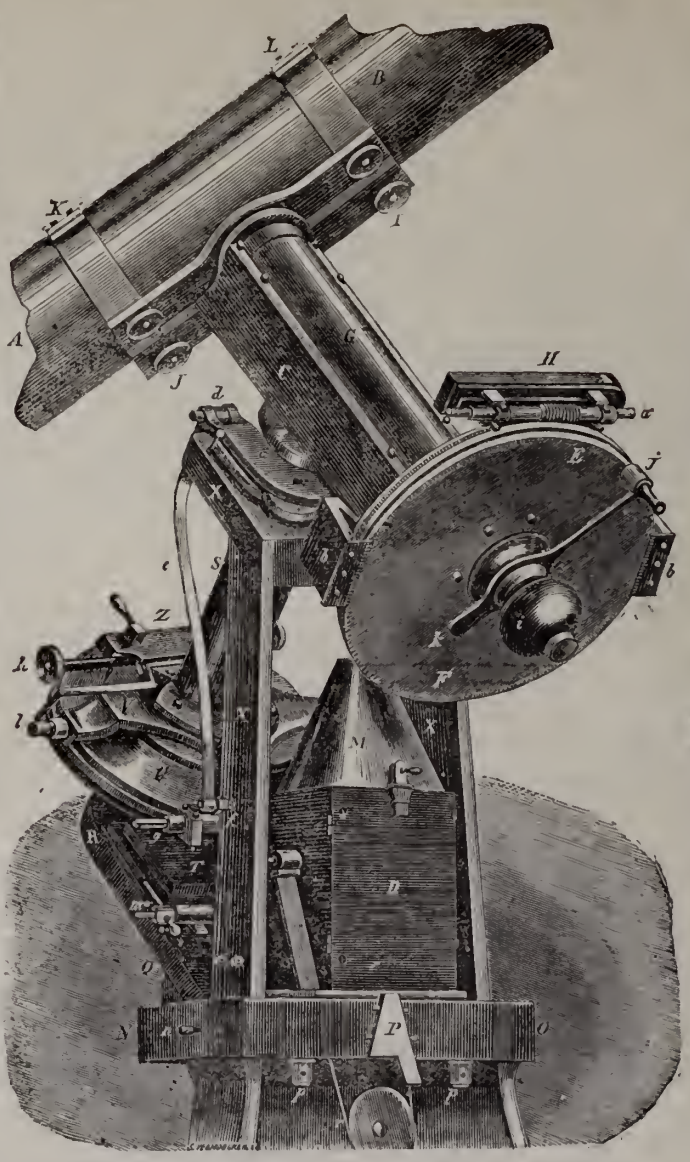


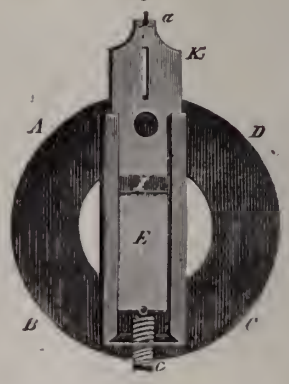
Fig. 2.



Fig. 3.



Fig. 4.



N.B. — The illustrations are from electrotypes, kindly supplied to Mr. Dallmeyer, by Dr. Van Monckhoven.

at each end of the cradle. A striding-level can, therefore, be applied direct to the axis itself for levelling by the removal of the clips at each end.

E F is the declination circle divided on the face and ratchet'd on the edge. A bracket, H, fixed to cradle C, besides verniers *b b*, carries the endless screw *a* for setting the circle, and which can be thrown in and out of gear by an eccentric, not shown in the sketch.

It may here be stated that all the endless screws used for dividing or setting the circles are kept in gear by springs, thus preventing all loss of time in any of the motions.

To facilitate the reading of verniers, both circles are provided with suitable microscropes shown at *j* and *l*.

A B is the telescope tube attached to the flange of declination axis, G by two ring clips, K and L held by the screws J I. It is balanced by counterpoise *i*.

The camera A (figure 2), of brass, about 20 inches long, suitable for plates 6 by 6 inches, is bolted to the flanged end of the telescope tube B.

Two handles, not shown in the sketch, allow of the telescope camera being turned in an arc of 90° The ring clips which attach the telescope to the declination axis are divided to this end.

The object glass D, of 3¾ in. aperture, and 50 in. focal length, corrected to combine the chemical and visual acting foci, screws into a tube sliding freely into the telescope tube; which affords an approximate adjustment for focussing on the cross wires to be referred to hereafter.

A ring clamp E, with screw, secures it in this position.

The fine adjustment is obtained by a sliding tube E (see figure 3), furnished with rack and pinion.

In the focus of the object glass is placed a dove-tailed slide, with two circular openings, across one of which is stretched a fine wire cross. A picture can thus be obtained, with or without cross wires.

The images of the sun, formed by the object glass upon the wire cross at B A, where it measures about ½-in. diameter is then received by the eye-piece, or more correctly, by a newly constructed enlarging lens, C, which projects an image about 4 in. diameter upon the screen B of the camera.

The exposure required to produce a collodion negative with the aperture of object glass reduced to 2 inches, is but the smallest fraction of a second, and is effected by an instantaneous shutter, shown at figure 3.

The shutter B, situated between the wire cross and enlarging lens, where a minimum amount of motion will effect an opening and closing, is made of brass, and slides freely in a dove-tailed groove of the plate A. Shutter B is held at its lower ends by the spring A, the tension of which is under control of a screw.

The arm D, with a pulley, supports the thread B, which, at one end, is attached to the shutter, and, at the other, to a hook mounted on the camera. When the thread is burnt or cut, the shutter obeys the force of the spring, and descends.

Figure 4 shows the construction of shutter B. The shaded part I, about 1-10th in. wide is a slot or opening in the shutter, which can be enlarged or contracted by another slide, E, moving in dove-tailed fittings, and acted upon by a screw, with an index accessible from without when the shutter is in position.

The time of exposure is regulated by opening or contracting the slot at any moment. The shaded circle above the slot represents an opening in the shutter which, when made to occupy a position concentric with the axis of the telescope, admits the entire cone of rays to pass unobstructed: thus forming an image of the sun upon the screen necessary for focussing.

The perpendicular slot with a pin, not shown in the sketch, controls the extent of motion of the shutter.

To insure the image being formed exactly on the centre of the screen, a finder-lens is fixed to the outside of the telescope tube in the focus of which is a divided ivory scale.

SOME REMARKS ON THE NEW CARBON PROCESS.

BY H. COOPER, JUN.*

Since the last meeting, I have been hard at work upon Mr. Swan's process, and, as is always the best plan where practicable, I have condensed the notes I made on my experiments in a short paper, by way of opening the discussion, instead of trusting to memory for them, and so tiring your patience with rambling statements.

Before proceeding farther. I propose that this society pays a vote of thanks to Mr. Swan, for his arduous labours in search of a process that should render photographic prints *absolutely permanent;* also for his liberality in placing the process so early at the disposal of photographers for experiment. At the same time, to congratulate him upon his eminently successful results; and I am confident that you will be unanimous in wishing that he may derive some "*sterling*," benefit from his work.

We will now pass on to some points in the process that appear to me worthy of notice. First, with regard to the quantity of water to be used in the preparation of the solution of gelatine.

Mr. Swan recommends 4 parts water to 1 of gelatine; now, with the dryest and toughest sample of gelatine that I have tried (retailed at 4s. per lb.), I have found the best proportions are 3 to 1, and with the softest kind 2 to 1. From this it would appear that the sample used by Mr. Swan, was of extra hardness and very dry. Different samples of gelatine have such a disparity in the quantity of water they contain, that it is impossible to give any fixed proportions; my advice is, when you have produced satisfactory results with one sample, stick to it.

That each person must determine the best proportions for himself is so obvious, that I should not have called your attention to this point, except to guard those who are about to commence their experiments with this process, from using their solution too thin.

By employing a strong solution, the difficulties of preparing the tissue are very much reduced, and when there is any tendency to a failure, to be noticed presently, it is lessened to a considerable degree. Another recommendation is this: when the collodionized plate is coated with a *strong* solution, the film will gelatinize in so short a time, that the glass may very conveniently be held in the hand, or placed on the top of a *cup* and turned slowly round till sufficiently set; thereby doing away with the necessity of a levelling stand. It is not at all necessary that the plate remain in a horizontal position till dry, it may with advantage be placed on a shelf, leaning against the wall, face downwards; and although it will take a little longer to dry than if it were arranged film uppermost, yet it will be effectually protected from dust, &c.

The annoyance referred to above is the separation of the pigment whilst the tissue is setting, and the thinner the solution the greater the tendency to this curious phenomenon. If it were not for the reflection that the tissue is useless, it is very amusing to watch the particles of colour gradually agglomerate and arrange themselves in all sorts of fantastic figures, much the same as when a glass covered with a fine powder is subjected to acoustic or electric influence.

Some pigments exhibit this tendency in a greater degree than others. The worst is chinese black. I have here a piece of tissue containing this colour for you to see the peculiar effect produced. Indigo is also sometimes subject to it. One evening I had prepared some tissue containing rose madder, and indigo, without any other pigment, when to my great astonishment the colour was precipitated; to the solution I then added a portion of indian ink, and curious to relate, the tissue remained perfect. For this process the pigments will require to be specially prepared.

* Read at the South London Photographic Society, on Thursday, May 12th, 1864.

Mr. Simpson states that Messrs. Newman are making preparations to supply it, and I have much pleasure in informing you that Messrs. Reeves and Sons are doing the same. They have already an assortment of water-colours in what they call a liquid state, and those that are permanent will be found to be specially adapted for the purpose.

I was at first much troubled with air-bubbles in the tissue, but soon discovered a very simple mode of preventing them; it is this: after thoroughly mixing the pigmented gelatine and bichromate solution, strain through muslin, when all the bubbles will be retained by the fabric.

At the last meeting a gentleman complained that his tissue was as "insoluble as leather," and I was then inclined to believe that he had mounted the tissue gelatine side downwards, which would offer an easy solution of the difficulty.

But during my experiments I have met with some curious instances of insolubility of the film, a few of which I will relate.

I, on one occasion, prepared a large batch of tissue, and printed upon some of it, 24 hours after, the results being quite satisfactory, with the exception of colour. The following day I proceeded to use the remaining portions, and found them absolutely insoluble.

In other instances, the tissue made from the same solution of pigmented gelatine and bichromate was insoluble, while some sheets were all right. I ought to state that I only mixed the two solutions as I wanted them, as insolubility might arise from the mixed solution being kept too long. Mr. Jabez Hughes suggested that too large a proportion of bichromate had been used, and that although satisfactory pictures had been produced, they were so near failures that some slight and unknown action had been set up, and thus destroyed the equilibrium. Encouraged with the hope that this was the case, I next time used half the quantity of the bichromate, but without producing any difference in the result. In all the tissue which was insoluble, I had used a small portion of prussian blue (which, by the bye, is not at all suitable for the purpose, as it is extremely fugitive), and was almost tempted to think that some chemical action had occurred between it and the bichromate; however, Mr. Simpson soon put this idea to flight by observing that he had succeeded perfectly with the prussian blue.

I can safely aver that neither the *sensitive* solution nor the tissue was exposed, during any stage of its preparation, to a temperature exceeding 90°. Up to the present time, I have failed in finding any satisfactory solution of this apparent anomaly, and am very anxious to hear the experience of other gentlemen on the subject.

The tissue, in my hands, has required, *in the shade*, quite as long as a silver print, whilst some, to whom I have spoken, have stated that they print in one-sixth of the time. Here is another point where comparing results will be valuable.

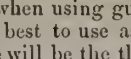
We now come to the mounting of the tissue.

The best method is the following:—Prepare two solutions, No. I containing 6 grains of pure india-rubber to the ounce of benzole; and No. 2, 6 grains of india-rubber and 10 grains of gum dammar to the same quantity of solvent. *Immerse* the paper in No. I, and *float* the tissue on No. 2. When dry, they will adhere perfectly by simply placing them in contact, and slightly rubbing the surface.

If india-rubber alone be used for both the tissue and the paper, I have found a great difficulty in preventing the tissue from cockling and separating at the edges during the washing; whilst if the solution containing dammar be used for both, the paper will not possess an even surface, the resin causing it to assume a very mottled appearance.

Using the solutions in the way just described I have allowed the mounted tissue to remain in water for 48 hours without its showing the least tendency to separate.

Very little difficulty will, I apprehend, be found in transferring the film, if the paper be moistened with a little benzole. I can only say that I have experienced none whatever; except when using gum arabic. I have [illegible] what is best to use as the adhesive substance, gelatine will be the thing; as it, of course, assimilates more than the gum with the surface of the print. Mr. [illegible] at the last meeting, showed a print to a few gentlemen, which the gum dammar had left very unsightly streaks.


Fig. 2.

I have not met with this in a single instance, and I am of opinion that the slight film of resin remaining on the surface of the tissue will tend greatly to preserve it from injury. One drawback to mounting the prints untransferred, is the extreme tenderness of the gelatine film; for if it get damp and is then rubbed, it will be very much abraded.

In conclusion, I will mention another peculiarity that I have noticed. When the mounted tissue is immersed in the warm water, all the portions of paper to which the tissue is attached become transparent, while the edges remain quite opaque. Has any gentleman noticed this?

A NEW OPHTHALMOSCOPE FOR PHOTOGRAPHING THE POSTERIOR INTERNAL SURFACE OF THE LIVING EYE.*

This paper was introduced by some remarks on the optics of the eye, showing that the blackness of the pupil under ordinary circumstances, and the invisibility of the parts behind it, depend not upon the total absorption by the choroid of all the rays of light that enter the eye, but solely upon the refraction of the rays by the dioptical media; and that a sufficient number of those rays are reflected from the fundus to be visible to an observer, were it possible for him to bring his eye in the same line as the rays of light illuminating the eye under examination, without at the same time intercepting those rays. This is impossible without some special contrivance for the purpose. It is best effected by substituting reflected for direct light with which the eye is illuminated, the observer placing his eye behind the mirror, and viewing the illuminating fundus through a small aperture in the mirror, as in Liebreich's ophthalmoscope, and simply through a piece (or rather three pieces) of highly-polished plate glass with parallel surfaces, as in the instrument originally used by Helmholtz. As employed by Holmholtz, the illumination of the fundus was too feeble, and was soon superseded by the more efficient and convenient instrument of Liebreich, which is the one now in general use by ophthalmoscopists. A fuller report of this part of the paper would render the article too lengthy for our limited space. We will therefore proceed to a description of this new instrument.

Construction.

The Tubes.—The instrument consists of two brass tubes 1½ inch in diameter, being respectively 4 and 2½ inches in length. The longer tube moves freely in a brass collar fitted to the aperture of a small camera, and the shorter tube is turned toward the source of light.

The Lenses.—At the inner extremity of the illuminating tube, and as close as possible to its juncture with the camera tube, a double convex lens is placed, 1¼ inch in diameter, and having a focal distance of 2½ inches.

The Camera.—The camera consists of a mahogany box 3 inches square and 7 inches high, having—to secure steadiness—a base 6 inches square. At the aperture in the centre of the anterior side there is a brass collar fitted, through which slides the tube containing the lenses. At the opposite side of the camera is a central aperture 2½ inches square, behind which is a slide with a piece of ground glass 2½ inches square. This slide moves in grooves for the purpose, and can be removed to make room for a slide containing a sensitized plate also about 2½ inches square. The whole is contained in a case about 8 inches in height, which serves the double purpose of supporting the instrument when in use, and holding it afterwards.

Photographing.

As yet I have not attempted a photograph of the retina of the human eye, but have confined my experiments to the lower animals, and have employed solar light only in order to shorten the time as much as possible; but I do not doubt that

* From a paper read before the Canadian Institute, by A. M. Rosebrugh, M.D., Toronto.

at each end of the tube, particularly that reflected from a bright cloud, be applied during the longer exposure, answer very well. In using the moval of the [illegible] this purpose, a tripod, or what answers quite as E F [illegible] of the ordinary height is placed near a window rate[illegible] light of the sun will fall upon it.

is well to have the shutters closed, and a beam of solar light admitted of the size of the illuminating tube; but this is not absolutely essential if precautions be taken to prevent diffused light entering the camera, and the ground glass be shaded while examining the image on its surface.

If the camera and tube be now in proper position, a cone of light will issue from the end of the camera tube through the centre of the aperture in the diaphragm. This cone forms a focus about half-an-inch outside the diaphragm, which can be seen by holding a small piece of white paper, near the diaphragm. If it be a cat or rabbit that is to be experimented upon, it is well to have it secured in a box of the right size, with the head projecting through an aperture for the purpose.

In photographing the eye of a cat, I found it necessary to put it under the influence of chloroform, but the image of the optic nerve, vessels, &c., upon the ground glass is so very bright and clear, that I do not doubt, if the most sensitive process be adopted, the impression could be taken instantaneously, thus rendering anæsthesia unnecessary.

Position of the Eye.—In either case the eye must be brought to the proper position, and the eyelids held apart by an assistant. If it be the eye of a patient to be photographed, the instrument must be mounted upon its case, which will, for most persons, give it the right height. The patient, being seated upon a chair as close as possible to the table, should lean forward toward the camera, and bring his eye as near as possible to the aperture in the diaphragm, the brow can rest lightly against the end of the tube, and by bringing the elbows upon the table, he can, with the palms of his hands, extemporize a very good rest for his chin.

The pupil of the eye to be photographed must have been previously dilated with atrophine.

Process.—If the instrument be now in its proper position, and the light from the plate glass enter the dilated pupil, the fundus of the eye will be brilliantly illuminated, and its reflection will pass out of the eye and through the plate glass and lenses, and form an inverted image upon the ground glass at the back of the camera, where the observer in the rear will see the optic nerve entrance, distribution of the arteries and veins, &c., beautifully depicted, but magnified about four diameters.

If the details of the image be not perfectly defined, the camera tube must be moved backwards or forwards until the proper focus be obtained. This image can be seen by the observer again very much magnified by placing to his eye a lens of say six inches focal length, and bringing his eye with the lens to within six inches of the ground glass; but the image will be seen even better by moving the ground glass to one side; the observer will then see the *aërial* image of the reflection of the eye, which will occupy the same position as the ground glass previously occupied. The slide containing the ground glass can now be removed, and a slide substituted containing a glass plate prepared by the ordinary collodion process. An exposure of about five seconds is sufficient. If the developing prove that a good negative has been obtained, it must be fixed and used for printing the photographs; if not, other plates should be employed until a more satisfactory result be obtained.

In ophthalmoscopic examinations of the interior of the eye, artificial light should be employed. That from a kerosene oil-lamp answers very well, but the best light for ophthalmoscopic purposes is from the gas argand burner, and the most convenient is the movable table lamp supplied with gas through a flexible tube.

The evening is the best time for making these examinations: if in the day time, the room must be darkened, and the instrument be placed in the same position in regard to the light, as when solar light is used; but the flame of the lamp should be brought within two or three inches of the entrance of the illuminating tube, and the two must be on the same horizontal line. A screen, to shade the ground glass and the observer's eye, should be placed between the light and the back of the camera, or, what I have found to be much better, a metallic shade can be placed around the lamp, from an aperture in which projects a tube or collar, somewhat resembling that of a magic lantern, of the right size to allow the illuminating tube of the instrument to fit closely.

Indeed, with this apparatus, the camera can be dispensed with altogether, that is, in making examinations of the eye simply; when the object is to demonstrate the fundus of the eye to a number of persons, the camera should be used both with and without the ground glass.

Application.—Advantages.

The advantages I claim for this instrument are:

1st. The simplicity of its construction, taking into consideration its twofold purpose, viz., as an ophthalmoscope, and as a photographing instrument. My friend, Dr. Noyes, of the New York Eye Infirmary, constructed an instrument for photographing the fundus oculi, and which was, I believe, to a considerable extent successful; but its construction was too complicated, and the instrument too expensive to be generally adopted. Dr. Noyes' instrument is constructed somewhat upon the principle of the binocular microscope. Any good optician can construct this instrument.

2nd. The limited experience necessary in order to use it successfully; the ordinary ophthalmoscope requiring months of practice before it can be used satisfactorily.

3rd. Being able to see the aërial image free from reflections from the object lens, which reflections are serious obstacles to beginners.

4th. Being able to receive the image, either of a healthy or diseased fundus, upon a screen of ground glass, which can be seen by a number of persons at the same time, and could be taken advantage of by gentlemen lecturing upon the physiology of the eye, or upon the pathology of its deep structures.

5th. With it, artists will be enabled to make coloured representations of the fundus, which, with the instruments now in use, has never yet been effected; thus Mr. Hulke, in his "Treatise on the Ophthalmoscope," and Jabez Hogg, in the preface to his "Manual of Ophthalmoscopic Surgery," (June, 1863), apologizing for defects in their coloured representations, state that it is impossible to procure the services of artists having the requisite knowledge of the use of the ophthalmoscope.

6th. Rendering it comparatively easy to photograph the reflection from the posterior internal surface of the eye.

I cannot conclude without expressing the hope that this instrument will contribute something towards awakening more of an interest in ophthalmoscopic science, as the ophthalmoscope is without doubt as essential in investigating diseases of the eye, as the stethoscope in diagnosing the affections of the heart and lungs: and I trust its use will aid in banishing from ophthalmic nomenclature the indefinite term of amaurosis, where, as Walther observed, "The patient and physician are equally blind."—*Humphrey's Journal.*

THE EARLY PHOTOGRAPHS.

The following extract from memoirs of Thomas Holcroft, may perhaps throw some light on the early photograph question. "1781. A project, which about this time engaged a good deal of Mr. Holcroft's attention, and excited very sanguine hopes in him, was the pretended discovery of the polygraphic art. The person who set this plan on foot was Booth, the manager of one of the theatrical companies to which Holcroft had belonged. He undertook, by some mechanical process, to produce copies of the old masters, such as Titian and Rubens, which, both in colour and execution, should not be distinguishable from the originals, and which were to be sold as cheap, or cheaper, than a common coloured print. This certainly was promising great things, if the performance had been answerable. Mr. Holcroft was so full of this scheme, and of the golden advantages it held out, that Booth having applied to him to assist him in it, and become a partner in the profits, he wrote to Mr. Greville, informing him of his sudden good fortune, and indeed offering him a share in so lucrative an undertaking. Mr. Greville, however, seems to have thought the success not so certain; and it was not long before Mr. Holcroft began to incline to his opinion. In his next letter to this gentleman, he confesses that he entertained some doubts on the subject, especially since he had heard that the same scheme had been tried before, and had failed: and further, that there were not half a dozen artists in the kingdom *who could copy the best pictures well enough*

to make it an object. In fact, this last observation betrayed the real secret: after an imperfect outline, or rude sketch had been struck off by a mechanical operation, any bungling artist, who could be found to do it cheap enough, was employed to finish the picture. So that, after all, this new mode of superseding the necessity of copying the old masters, was nothing more than an attempt to set up a cheap wholesale manufactory of bad copies of good pictures. Mr. Holcroft, however, though his ardour very soon cooled, was willing to wait till he had seen the specimens which Mr. Booth was busy in making of some famous picture, but which he was very backward in producing. The subsequent fate of this photographic scheme is well known to the public."

[It is known to our readers that the alleged early photographs have been supposed to be polygraphs; but the subsequent fate of the scheme does not now appear to be so well known as at the time of writing the above memoirs.—Ed.]

Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting of this Society was held on the evening of Thursday, the 12th inst., in the City of London College, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes of a previous meeting were read and confirmed.

Mr. Wharton Simpson exhibited some very fine portraits by Mr. Brothers, of Manchester, with the aid of the magnesium light.

Mr. Wall called attention to a number of a new photographic publication, entitled the *Philadelphia Photographer*, and read a brief extract from it referring to the Sanitary Fair, to which photographers were invited to send contributions.

Mr. H. Cooper, jun., then read a paper entitled "Some Remarks on the New Carbon Process" (see p. 245). The paper opening with a proposal for a vote of thanks to Mr. Swan for his labours in perfecting such a process, and the liberality with which he had permitted experimentalists to use his process,

Mr. Martin seconded the motion, which was passed unanimously.

Mr. Cooper then proceeded with his paper, and exhibited several specimens of the prints and examples of the tissue illustrating the remarks in his paper.

The Chairman, in proposing a vote of thanks to Mr. Cooper, made some remarks on the beauty and value of the process.

Mr. Simpson, in reply to a question from Mr. Cooper, as to the adhesive material used by Mr. Swan in transferring the prints, stated that Mr. Swan had found that where the blacks possessed much relief, an adhesive material, possessing some *body*, should be used, which would not, in drying, shrink into considerably less space than it occupied whilst moist. The reason for this was the fact that in order to secure perfect adhesion it was necessary to fill up the interstices of the picture with the adhesive material, otherwise the thickness of the parts in relief would prevent perfect contact with the sunken portions, which were the thinnest parts, and required, for a satisfactory effect, very perfect adhesion. Mr. Swan had found that a thick solution of gelatine, with zinc white added to give body, answered the purpose best.

Mr. Cooper remarked that his own prints were in much less relief than Mr. Swan's, and he found also that his had not such a glazed surface as those of Mr. Swan's.

Mr. Simpson had used flour paste for transferring, and found it answer well.

Mr. Sebastian Davis asked Mr. Cooper if he found any difficulty with the films curling. He had found that thin films had a tendency to do so.

Mr. Cooper had sometimes found that tendency; he found that the larger the picture required the thicker the tissue should be, to secure anything like convenience.

Mr. Foxlee had made a few experiments with this process. His first difficulty was that the tissue was perfectly insoluble with any treatment, whether the water were at a temperature of 100° Fah. or at boiling point. The tissue remained like leather. This was with gelatine at 6d. per ounce. He next tried some at 10d. per lb. This he found too soluble, all the image dissolving away, even in cold water. He next tried glue, but the results were not good. He next obtained a sample of the gelatine used by persons engaged in glazing boxes, making sheets of gelatine paper, &c. This was 1s. 3d. per lb., and answered admirably, and he obtained the specimens and tissue he now exhibited. He found that a good test of quality was the fact that good gelatine would not dissolve in cold water. Mr. Foxlee handed round some fine specimens.

Mr. Simpson explained that this was a technical test employed by persons using glue. If the glue, when broken up and immersed in water, merely swelled up into a jelly, not forming any trace of solution, or even discolouring the water, it possessed the best adhesive qualities, and was strong and tenacious.

Mr. Foxlee, in answer to a question, said the glue he used seemed to have the quality of dissolving albumen, for, on adding the egg to clarify it, and boiling, the albumen did not coagulate. He presumed an alkali was present. In regard to exposure, he had found that one-sixth of the time necessary for silver prints was sufficient in any light, sunshine or shade.

Mr. Cooper had found longer exposure necessary; and he found that whilst the tissue printed more rapidly than silver prints in sunshine, it was not so in diffused light. Mr. Simpson had made the remark to him that the increase of sensitiveness over silver printing which was found when the tissue was exposed to the sun, did not seem to obtain in a dull light, and he had found it so. In reference to the collodion, he had tried some samples that did not leave the glass well. Mawson's plain collodion gave him the best results in all respects.

Mr. Simpson remarked, in reference to some observation on the difficulty of removing the yellowish or greenish tint left by the bichromate notwithstanding continued washing, that it seemed to have been overlooked that this green tint was not due to imperfect washing, or to be removed by any process of washing. By the reaction of a bichromate on gelatine in the presence of light, green oxide of chromium was formed, which was combined with, or imprisoned in, the gelatine rendered insoluble. If, therefore, a pure black pigment only were added, the picture would be formed of black mixed with green, a tint very undesirable. It became necessary, therefore, to add some tint of purple, or blue and red, to correct the green effect conferred by the oxide of chromium. He then proceeded to point out how the sensitiveness of the film seemed to increase up to that point at which it ceased to be useful, the time varying with circumstances. Mr. Simpson then read some details of experiments, the results of which are embodied in our article on the subject last week.

Mr. Martin said that Mr. Harmer had mentioned to him that gelatine was procured from various sources, some from fish and some from the skins, hoofs, &c., of horses, and this would probably account for the varying results described.

Mr. Simpson remarked that he had reason to believe that it was the gelatine obtained from fish refuse which gave the very thin films, being very soluble and having little body. These samples would generally form a solution, or something very like it, with cold water. He was inclined to think that the fish gelatine should be avoided in this process.

Mr. Howard had tried Nelson's patent gelatine, he found it not only very soluble, but that the tissue made with it remained a very long time tacky. He had used bichromate of potash. He thought that a gelatine prepared expressly for culinary purposes would probably keep moist in that way.

Mr. Simpson suggested that the use of bichromate of potash, instead of bichromate of ammonia, might partly account for the tardy drying.

Mr. Davis said he had used the same gelatine with the same results, and he had used bichromate of ammonia.

A conversation on different samples of gelatine followed, and the size of plates used for the tissue. Mr. Foxlee used 10 by 8.

Mr. Martin remarked that possibly the double bichromate of potash and ammonia, which had been recently described. Chromic acid, was, he believed, the really active agent, and it might be that a salt containing a larger proportion, say three or four parts instead of two, as in the bichromate, might be prepared, and give still better results. Possibly, chromic acid itself might be used.

Mr. Simpson explained that chromic acid had been used by Mr. Dallas. He believed it was quite efficient, but less under control than when combined with a base. The chromic acid was, of course, the active agent, its decomposition by light

furnishing oxide of chromium and oxygen, the latter combining with the gelatine and converting it into its insoluble condition.

A conversation on the relative cost of carbon prints and silver prints followed, and the necessity involved for skilled labour in the former. Also on the use of a camel-hair pencil to aid in removing the unaltered gelatine and pigment, which might, it appeared, be used in some cases with advantage, but caused some danger to delicate portions of the print of being injured.

Mr. Simpson explained, in answer to the Chairman, that he regarded the absence of gloss on some of the specimens he exhibited, as being chiefly due to the use of a very thin layer of gelatine, with plenty of colour, in preparing the tissue.

A conversation on the advantage of the granular effect of some defective prints followed.

Mr. Howard regarded them as similar to good lithographs, the effect for large pictures being, he thought, good.

Mr. Simpson thought that the grain produced might possibly be of service in photolithography, if one of the prints were transferred to stone.

Mr. Wall thought that a uniform grain for all parts of the picture would not give good results.

Mr. Hart thought that such prints resembled mealy silver prints, which so much effort had been made to avoid.

Mr. Martin suggested that possibly an adaptation of these prints might be made to Mr. Wallis's process for obtaining engraved plates.

Mr. Simpson said the same thought had occurred to himself, and that he had, in fact, some remarks on the subject in preparation.

Mr. McNicoll referred to the advantage of permanent prints for book illustrations and other similar purposes, exhibiting some medallion portraits used to form part of the illustrated frontispieces of music, in which he was composer, poet, and photographer.

A conversation on the permanency of silver prints followed.

Mr. McNicoll then exhibited some of his improved glass paper clips.

Mr. Wall called attention to the fact that the next was the annual meeting, when new officers must be appointed, and read a list of names nominated by the committee. He announced that he must resign the secretaryship, and that Mr. Howard, under certain conditions, would accept the duty.

The proceedings then terminated.

Correspondence.

PROPOSED INCREASE OF REGISTRATION FEE.

Dear Sir,—I would advise you to give in your valuable paper a *form* of petition to the House of Commons, which the photographers in every chief town in England should be recommended by you to transcribe on a foolscap sheet of paper, get it signed by as many in the town as agree with its prayer, and then transmit it to their member for presentation.

In most cases where portraits of eminent men are taken, several positions are secured; and to be compelled to pay a half-crown registration fee on *each* of these, is a most exorbitant sum, and totally uncalled for by either principle or policy.

The more petitions, the better, as they will effectually call the attention of the House to the proposed injustice.—Yours truly, G. S. N.

54, *Cheapside, May*, 1864.

[We shall shortly give such a form of petition, and strongly recommend photographers to follow the suggestion here given.—Ed.]

PHOTOGRAPHY IN INDIA.

Sir,—In your paper of the 13th November I see, a paper by Mr. Warner, on "Photography in India." I trust Mr. Warner's pupil has benefited by the spongio pilene. I have some experience of India, having been east, west, north, and south for fifteen years, and I have photographed in very hot weather, and am generally thought not unsuccessful. I question if Mr. Warner knows anything about it. Let him try photographing with the thermometer at 90° in the shade, and the sun beating on his tent, with his head weighty from the rush of blood, and his face and hands dripping with perspiration, and he will know the inconveniences of Indian photography.

I cannot say I ever felt the want of spongio pilene in my camera. I am far from clear that dryness alone is the cause of want of actinism, not quite sure that there is a constant want of actinism.

In one way drought is a cause of bad light. Dry air is a bad conductor of electricity, and every motion causes friction and develops electric phenomena. To carry off this charge dust rises from the ground (and acts in a very similar manner to the bits of paper, in the well-known experiment), the particles rising and falling, the result being that the air is charged with fine dust in suspension, stopping light, and filtering out the actinic rays till the evening sun, which, when ten degrees high, is often a red ball. I have no doubt that the early morning is the pleasantest time for photographing but one cannot do much by confining oneself to that hour. The desired picture may be badly lighted at that time, or fifty things may happen.

If one had an undoubted dry process, and a quick one, that would be perfection, because we could make and develop our plates at night, with any air that is going playing about; but I despair of that, and endure heat as best I can, in a Smartt's tent.

This is as dry weather as usually comes in India, but I lately found my constant, as I described in a letter from the north-west provinces, to be 0·0055, which may be put in common language as half a second's exposure with a Dallmeyer's 1B lens, and No. 4 stop (0.448 in. diameter), for trees pretty close, and in shade at 9 a.m.

Perhaps Mr. Warner is not aware that, dry as Indian heat often is, the absolute amount of water vapour in the air is quite as great as in more temperate climes.

I don't believe anyone can invent in England dodges for India. You may be thankful that you do not know what heat is. I know old Indians tell you summers are as hot as in India, but when I hear of the thermometer being, as I have seen it, 130° in the shade, I shall believe them.

I send you a bit from this, which will, I trust, show that Mr. Underwood's talk about softness not being attainable in India, is a thing of the past. The large tree on the left is a tamarind, and, with the two pictures in a stereoscope, you can see every pod. It is very bad paper, as you can feel. Indeed, in some pieces, the red spots and the dark parts before toning are nearly equally divided, but I never find them last. I tone each picture separately, in carbonate of soda and gold, very strong.

I trust you won't find this too long, and am now, to my loss, an Inhabitant of India beyond the Ganges.

P.S.—My picture was taken at 2 p.m. and could not have been taken at sunrise.

Thyetmyo, March 7th, 1864.

[It is to be regretted that the experiences of photographers in India, have not been detailed with as much minuteness or frequency as might have been desired. Mr. Warner doubtless gave the best conjectural hints he could. There is in Bland's "Practical Photography," a very interesting chapter on tropical photography, written by a gentleman who had spent some time in the West Indies. Mr. Walter Woodbury gave some interesting experiences of photography in Java, in our pages some time ago. Perhaps now that he is settled again in this country he may be induced to give the photographic world the benefit of some further information on the subject. Our present correspondent, whose enclosed photograph is a charmingly soft bit, could also probably give valuable advice as to the processes, formulæ, and method of working he finds most successful.—Ed.]

THE "ATHENÆUM" ON THE INUTILITY OF PHOTOGRAPHY.

In a notice of some clever drawings from the Zambesi River, with which your respected contemporary favoured his readers on Saturday last (May 14th), the following astounding piece of "advice gratis" occurs:—

"We counsel the artist, should he visit the country again, to pick out some characteristic scene, not the most effective, and sitting down before it, deliberately represent it without the thought of producing a picture. Let him depict all things patiently and thoroughly as they stand before his face in the open air. This done, he will bring to us a representation that will be worth a legion of sketches and a world of photographs."

What do you say to that, sir, for a bit of free-and-easy criticism? Or, perhaps, you have nothing to say; not even a "boo" to fling at the goose cackling so rarely. What are we, poor idiots, doing, who travel about the country with three sticks and a peep-show, planting our rattletraps before this glorious landscape or that magnificent building, and only becoming, for all our pains, daily better known to the rural police than to the literary ditto? What of Mr. Star's landscapes in our exhibitions? or Blank's stereos, which the wretched perpetrator fondly hoped were something like the lovely spots so egregiously misrepresented? What ——? But, I fear, Mr. Editor, you are posed at last; in fact, quite dumbfounded. May your recovery be speedy, at any rate, not later than the middle of next week.—Yours,

Whit-Monday, 1864. Rho Delta.

[The *Athenæum* is, unfortunately, fond of having a sneer at photography. It is of little consequence, for with its habitual inconsistency we should not be surprised to find an intimation next week to the effect that photography is the only truthful method of delineation that was, is, or is to be. —Ed.]

THE NEW CARBON PROCESS

Sir,—I send you herewith a statement of the results which I have arrived at in my experiments on Mr. Swan's carbon process. I intend to practise the process experimentally for some little time, and hope soon to send you some larger prints than I have yet attempted. Up to the present time my object has been to determine the keeping qualities of the tissue and render myself *au fait* in its manipulation.

The bichromate which I used left a very considerable deposit in 3 parts water. I, therefore, used 1¼ parts instead of one part of the solution.

I could get no adhesion whatever with the solution as given in the News, and, therefore, largely increased the proportions of dammar and india-rubber, until I got a solution something like rather thick collodion. Even then it sank into the paper, and several applications were needed both to the paper and the tissue, and finally the two were brought into contact before the surfaces were quite dry. They were well rubbed down with a strong ivory paper knife, as I had no rolling-press, and allowed to become quite dry before immersion in water. The paper used was ordinary plain photographic paper. Strongly sized and very hard paper should not be used if the pictures are to be transferred, as the benzole will not penetrate it sufficiently to release the film.

1st Experiment.—Gelatine, Nelson's patent. Tissue exposed within twenty-four hours of its preparation, all results good with about half an hour's washing. Image rapidly appeared, and by increasing the temperature of the water after five or six minutes, the soluble portions of the gelatine cleared very quickly away.

2nd Experiment.—Same tissue used four days after preparation. Required longer soaking and water at about 160°. The gelatine broke away at first from the surface in large flaky masses on pouring the water from a height of a foot. The masses getting smaller and at last washing away in fine particles as the collodion film was approached. Time of cleaning picture 1½ to 2 hours.

3rd Experiment.—Same tissue carefully preserved from light and damp, used 14 days after preparation. Seven hours soaking in warm, and finally in continual changes of hot water, only swelled the tissue, rendering it thick and leathery, with very rough surface on gelatine side. The tissue becoming very tender, although apparently hard, breaking away at its edges on the slightest touch. The picture was seen to be impressed in the tissue, its outlines standing out in distinct ridges.

4th Experiment.—Gelatine, French, bought at Phillpott's Westminster Road, at 1s. 9d. per lb. Tissue prepared eight days before use. Required soaking in constant changes of warm and hot water for seven to eight hours, and the pictures developed with much difficulty. The tissue first swelled, and became tough, smooth, and leathery, gradually softening under the influence of the water.

As far as my present experiments and observations go, I am of opinion that the sensitiveness and difficulty of developing are both increased in proportion to the age of the tissue. Practically, I think 48 hours should be somewhere about the extreme time for the tissue to be kept before exposure, as I am pretty well satisfied that, in addition to the increased difficulty in developing, the resulting pictures are not so good with older tissue, the delicate shadows of the picture not being well rendered.

It is *very important* not to raise the temperature of the gelatine solution to anything near that of boiling water after the bichromate is added. I found, in one instance, an insoluble mass at the bottom of the containing glass vessel.

The French gelatine mentioned above is very much slower in setting than Nelson's, but is much cheaper, Nelson's costing 1s. for about 2 ozs.—Yours obediently, F. W. H.

May 11th, 1864.

THE NEW CARBON PROCESS—MOUNTING.

Dear Sir,—After encountering all the difficulties stated in your leader of last Saturday, for the mounting of Mr. Swan's tissue, I beg to communicate to your readers a successful method I have adopted, after trying every other known means of adhesion without success. I think this method meets the case completely and satisfactorily, as no amount of soaking in boiling water can ever separate the paper from the tissue; in fact, it is impossible to separate them without destroying them both.

Take a piece of albumenized paper (I have used the paper for silver printing, but of course the salt would be omitted when prepared for this purpose), slightly damp it, so as to make it quite sticky all over, lay the tissue gently down on it, beginning at one side, so as to prevent air bubbles; lay a piece of clean paper over both, and rub down briskly till the two are quite adherent to each other, just as in mounting a silver print. Then, on a piece of clean glass, pour a few drops of strong alcohol, spread over the glass, and lay the mounted tissue down on it, paper side down, let it lay a few seconds, when the albumen will be thoroughly coagulated. Pin up till thoroughly dry, when it will be ready for development, and no amount of soaking will ever separate them.

I think Mr Swan deserves the thanks of the whole photographic profession for his beautiful discovery, and I think with your correspondent it was a pity he took a patent as I suppose he is likely to be involved in endless litigation, although his claim can never be questioned for one moment. No doubt the same materials have been in use every one of them for a long time. But who has shown the pictures? There's the rub. I have succeeded with the process from the day it was first described in the News. I have no difficulty in producing the tissue any size up to ten inches square. The picture is always visible to the eye just when printed. I have met with the difficulty complained of by your correspondent, namely, the insolubility of the film, and it does *not* seem to me to be due to the use of boiling

water, as I have invariably begun the development with a much lower temperature than 100°, as recommended.—I am, yours obediently, P. Henderson.

3, *Park Hill, Clapham, May* 12, 1864.

THE NEW CARBON PATENT.

Sir,—When Mr. Swan's first specimens were seen, photographers wondered how these marvellous prints could have been produced; and their impatience to hear him read his paper was great. Now he has told them all about it, those who have been so very near inventing the long-desired carbon process, but have failed, jump upon him and claim his success as their own, as is the manner of unsuccessful men in many pursuits. It is the old story of Columbus and the egg over again: everybody can do it now they know how, and could have done it anytime these dozen years if it had been worth their while. The quarry-men who dug the marble, claim the statue. It is suggested by some of your correspondents that Mr. Swan's patent cannot stand, and they point out every imaginary flaw in the specification they have *not* seen, for no other reason, that I can perceive, than to benefit the pirates. All this suggests the question, Is the sense of honour and honesty quite dead amongst photographers? "Is there no virtue extant?" It has been proposed to buy up the patent, or to pay a royalty in one sum for its use, anything to prevent the inventor from enjoying his own patent in his own way. If these ingenious drivers of coaches and horses through patents mean well to Mr. Swan, and wish to do the right thing, let them subscribe a sum to enable him to prosecute the first robber who attempts to infringe his patent.—Yours, Henry P. Robinson.

[We are aptly reminded by those who appear to doubt the novelty in Mr. Swan's process of Milton's lines:—

> "The invention all admired, and each how he
> To be the inventor missed; so easy seemed
> Once found, which yet unfound, most would have thought
> Impossible."

We have repeatedly heard the thought very decidedly expressed, that, to produce carbon prints with half-tone, and other good qualities equal to silver prints, was impossible. The prints are now produced, and the process described, and forthwith we have a vast number of persons who seem to think that they could have done it themselves, if Mr. Swan had not impertinently anticipated them.—Ed.]

SWAN'S NEW CARBON PROCESS.

Dear Sir,—In mounting the new tissue, before applying it to the pasted paper, the tissue should be laid on a plate of glass, or other smooth hard surface, with the collodion side uppermost, and carefully pasted, using a rubber of cotton cloth. If the tissue has been handled, or in contact with other bodies soiled by fingering, perfect union of the tissue and paper will not take place; I therefore consider it absolutely necessary in this part of the process to be very particular in wiping the tissue with the pasted rubber. The paper being then layed on the tissue, pasted side down, at least two thicknesses of blotting paper should be laid over it. It may now be rubbed with the hand or glass roller or the press, whichever suits the individual taste. You may now develop without fear of losing your pictures. For pictures to be transferred, caoutchouc varnish is to be preferred; but the same rules apply to it as in the use of starch paste. A formula for a good varnish stands thus:—

Benzole...	...	...	...	4 ounces.
Gum mastic	...	...	...	20 grains.
Gum dammar	...	...	...	60 „
India rubber, in its native state				20 „

A little powdered glass added will assist the perfect solution which should be accomplished without artificial heat in six or seven days. It must be frequently shaken, and when dissolved, to be filtered through paper. Every vessel used should be perfectly dry, or the resulting varnish will not be transparent.

Two errors in my last require correction; the first, the formula should be

Gelatine	...	...	...	2 ounces.
Water	...	...	...	10 „
White sugar	...	...	...	½ „

In the fourth line from bottom, instead of—and then worked up; should be—and then *corked* up.

During last November and December, I tried many experiments in a carbon process for printing enlarged proofs, in the solar camera with the best results. I shall send you the particulars. There are no secrets in it, being all second-hand information to me.—Your obedient servant,

H. R. Nichols.

Photographic Notes and Queries.

Mr. Hanbury's Washing Machine.

Sir,—Can you or any of your readers kindly tell me what to do with the diaphragms of my "Hanbury's Washing Trough."

The friction of the diaphragms and the concussion, when the machine tilts over, causes the black varnish to come off, and the frames then rust and spoil my prints.

I have lost a great many in this way.

Do you know of any varnish that could be easily applied, and that would stand the friction, and not rub off?

In default of a better plan, I am thinking of getting some brass frames made, and stretching thread dipped in lac varnish across them: would this answer?—I am sir, yours truly, G. A.

[Can any of our readers suggest a remedy?—Ed.]

Manipulations in the New Carbon Process.

Sir,—Will you oblige me with answers to the following questions, which I find arise in my first experiment with Mr. Swan's process.

1. Does it affect the result if ordinary bromo-iodized collodion be used?

2. What space of time should elapse between collodionizing and gelatinizing?

3. How do you apply the gelatine? I find it won't pour and spread like collodion.

4. Do you, after pouring on the gelatine, level the plate or drain it?

5. What quantity of gelatine solution remains on the plate, *i. e.*, is it to stand on as a pool all over, or to be treated as in collodionizing?

6. Is it desirable to filter the solution whilst hot?

7. I find the film so thin as to be irremovable, and thence infer, I ought *not* to have drained the plate, but to have allowed an appreciable quantity to remain on it standing level.

F. S.

[1. Ordinary bromo-iodized collodion may be used if the film be tough and suitable, as the salts it contains will be removed in washing.

2. It is only necessary that the collodion film be thoroughly desiccated.

3. Pour on, and lead with glass rod or camel-hair pencil. See article in this week's News.

4. Level the plate, not drain it, unless the solution be very thick indeed.

5. Just sufficient to get the right thickness of tissue. Experience will alone guide you in getting exactly the right thing.

6. The gelatine solution should be cleared with albumen, and filtered through flannel whilst hot, and before colouring or sensitizing.

7. Your solution was probably thin, and you drained the plate too much; and then probably attempted to remove it before it was quite dry, in which case it would be too thin and limp to be removed.—Ed.]

Magnesium Light.

Mr. Editor,—I think it right I should explain my notice in your News of this week, and it may serve as a warning to

others of the craft, not to place faith in man or his promises. When, in February last, I read about the success in Manchester from the magnesium light, I immediately put myself in communication with a chemist for a supply, considering myself bound to the photographic public, to be in the field with the first for supplying them with any interesting novelty for the art. My supply, as promised, by the chemist, came in due course at the very moment your *Journal*, and a *Circular* from Johnson and Matthey arrived, stating prices at which the public could be supplied. I called personally on Messrs. Johnson and Matthey, and gave them an order for several ounces, and they promised me I should have it the following week, I trusted to their respectable position, and believed what they stated to me, and immediately advertised and sold my pure magnesium wire at less than it cost me per foot, but my supply from Johnson and Matthey never came but in dribblets, and, as our bard says, small "by degrees and beautifully less," the last delivery, weeks since, was one-eighth of an ounce of wire, since which I have had none. The puffing at the Philosophical Society about the public getting supplied at 3d. per foot is all moonshine.

Another laughable phase is, that a comfrere followed very lately the Will-o'-the-Wisp, and began advertising the wire at 9d. per yard, and had none to sell.

I am afraid my dream of supplying my customers with a bright light for dark days, so that instantaneous portraits *should flash* from their *glass and brass*, must be posponed until some new-born chemist fulfil the surmises of the Manchester one to supply sunlight to the public *à discretion*.

I trust my explanations will exonerate me with my customers for not executing promptly their orders for this wire.— I remain, yours truly, J. Solomon.

22, *Red Lion Square.*

Talk in the Studio.

Photographic Exhibition.—The Exhibition of the Photographic Society will probably open for the private view, in the Gallery of the Female Artists, 48, Pall Mall, on Saturday next. The contributions will include many specimens illustrating very great progress in what has been termed press photography, that is, photolithography and photo-engraving.

To Correspondents.

W. C. J.—If the silver in your solution be precipitated by chloride of lime, or any other chloride, it cannot be treated in the way described on p. 34 of our Year-Book, which solely refers to a carbonate of silver, inasmuch as chloride of silver is not soluble in nitric acid. Chloride of silver must be reduced to the metallic state before it can be re-converted into nitrate. See the chapter on recovering silver from residues in our Year-Book. Silver precipitated by any carbonate can be treated as described on p. 34. 2. You may procure a camera suited for taking pictures from card size to whole plates, and a good quarter-plate card lens will generally permit the front lens to be removed, and will take whole-plate views. 3. A Kinnear camera will be a suitable form, if you require it chiefly for views. 4. We cannot mention special lenses or makers here: consult our advertisements, and then send us a numbered list, if you require further advice. 5. For open-air portraiture you require a canopy and wings, each projecting about four feet, attached to your background.

Inverness.—We think we have heard of such a company, but have no further knowledge of it than a dim recollection of the name.

A Day Plate.—If in following the formula of which you speak your chloride of gold were neutral, or very nearly, to begin with, a slight trace of alkalinity might be induced, and in such case, if the solution were allowed to stand in the light, a gradual precipitate of gold would ensue. This precipitate is metallic gold, and may be reconverted into chloride in the usual way. 2. The addition of any organic salt to a bath, such as muriate of morphia, renders necessary great care in all the other conditions from its reducing tendency; probably you have not given that care. We have had many very good accounts of the results.

Epsilon.—The best and fullest account of the working of the tannin process is to be found, of course, in Major Russell's book. You will find a very full statement of details on pp. 398 and 409 of our last volume, which also contains several other valuable articles on the process. 2. You will find the desired formulæ in our last Year-Book. 3. We have several excellent tents and developing boxes lately, but we cannot undertake to say which is best, as each has advantages of its own. 4. You will find the information in the Year-Book, to which we have already referred you.

J. Griffiths.—The small portion of salt you enclose is crystallized nitrate of silver.

S. G.—The yellowness is caused by imperfect fixation. The hypo solution has been either weak, old, or exhausted, or the prints have been insufficiently immersed, or stuck together. The yellowness is the result of insoluble hyposulphite of silver having been formed, which has decomposed, causing the discolouration on exposure to light and air.

D. C.—It is a common fault of dark slides to be made so as to fit too tight. Scrape or rub them down with sand-paper, and then apply a little black lead, which will materially relieve the friction.

G. H. C.—For copying purposes the balance of advantages is obtained by having the stop in front.

Novice.—For taking portraits in the open air, it is desirable to have projecting from the frame of the background a canopy and wings projecting about four feet. The wings may be hinged, so as to admit of being opened or used as reflectors, at will. 2. A positive converted into a negative does not usually give as good results as a negative taken with proper exposure, as the exposure given to a positive is generally insufficient for a good negative. You will find various formulæ for intensifying processes in our Year-Book, which will also give you advice on card pictures.

J. H.—We do not know the number of prints which can be mounted in a day, nor the price paid for such work. We notice in the trade list of a photographic mounter that from 9s. to 12s. per gross is the charge for mounting and mounts; and as the mounts cost from 3s. 3d. to 4s. 6d. per gross, the mounting costs about 6s. or 7s. and upwards per gross.

J. Robins.—Your letter has been forwarded.

S. V. X.—There are no certain means, except examining the registry, of ascertaining when a picture is copyright. It is right to assume that all are, and not attempt to copy without leave of the publisher. If you see a horse grazing on a common you assume it to be the property of somebody; you do not say, in the absence of any apparent owner, "I will appropriate it;" neither should you do so with regard to copying pictures. The copyright law is contained in nineteen Acts of Parliament, which may be obtained of Spottiswoode's. A new Bill abrogating the old ones, and condensing the law into one Act, is before Parliament.

Pierre.—You can, doubtless, obtain Mr. Pouncy's prepared paper from him. There is no very definite description of the method of preparing it published. We cannot imagine any reason for your ink refusing to dissolve, even when it had not been exposed to light, unless you used a very absorbent paper which held it with tenacity, and, therefore, would not become quite clean and white again.

G. A.—Your general effect of lighting is not bad; but you require a little more concentrated and direct light, and less diffused light. This will give your pictures more force and brilliancy.

J. S.—You appear to be practising photography under difficulties with very fair success. Your lens appears to be very imperfect, and covers a very limited field indeed; but we do not, from your description, know what kind of lens it is. It is probable that the reservoir water will answer best for washing purposes. Gutta-percha dippers have frequently a basis of iron wire, and are not safe to use. We prefer glass dippers. When intensifying is effected after fixing, especially if it have to be pushed far, pin-holes are sometimes troublesome: when the tendency is present, it is better to intensify before fixing. Nitrate of soda will not precipitate nitrate of silver; if a precipitate fall, it arises from some impurity present, possibly carbonate of soda, which threw down carbonate of silver and weakened the bath by so much as was thrown down. In the formulæ to which you refer the proportions of nitric acid are rightly stated. Glacial acetic acid is the strongest. Beaufoy's generally about one-third of the strength of the glacial. Chloride of ammonium is the correct term, not of ammonia. There is no need for any special comment on the work of your lens in the different pictures you send us: it is defective in all, except the vignetted bust. We shall be at all times glad to help you, but to enable us to do so efficiently you should describe your troubles clearly and briefly, keeping each subject to itself, and numbering questions, when you have many. It is very probable that we may not have fully cleared all your difficulties, from the simple fact that they are not stated clearly and distinctly, your letter being too rambling, lengthy, and diffuse, and not very legibly written. It is not easy to decipher questions on unknown troubles written on scraps and corners of paper. Write again in separate and clearly-stated paragraphs the further questions you wish us to solve, and we shall have pleasure in aiding you.

S. Stevens.—When albumenized paper becomes discoloured, immediately it is sensitized it generally indicates some fault in the preparation of the paper. A little nitric acid added to the bath will, probably, prevent this; but we prefer the quality of prints produced by a neutral bath.

X.—The term solarize, as used in photography, has an arbitrary meaning, and refers to the over-action of the light on the lights of a negative or a daguerreotype. 2. You may generally get rid of bronzing by using a weaker bath. 3. When the toning solution becomes blue or red, it indicates a certain amount of reduction in the gold, the blue tint shows the greatest reduction.

J. Cockin.—The suggestion is a good one. We will publish it in our next.

The Bromine Question.—Mr. Hughes' concluding article on this subject, together with several other articles and letters, stand over until our next.

Earata.—In the Rev. Wm. Law's letter "On the New Iron Developer," p. 218, in the second paragraph, for "*liquer*" read "*liquor*." In the third paragraph, for "*theory*" read "*thing*." In last paragraph, for "*propose*" read "*purpose*."

Photographs Registered during the Past Week.

Mr. William Plumtree, Louth, Lincolnshire,
Photograph of the Earl of Yarborough.
Photograph of the Countess of Yarborough.

Mr. H. Thomson, 30, George Street, Bath,
Two Photographs of J. M. Barclay, Esq., A.R.S.A.
Two Photographs of Dr. McDonald.
One Photograph of the late Dr. Riach

Mr. F. York, Bayswater,
Photograph of H.R.H. the Princess Mary in a Carriage.
Photograph of H.R.H. the Duchess of Cambridge in a Carriage.
Photograph of the Grand Duke and Duchess of Mecklenburg Strelitz.

Mr. Wm. Wilby Law, 49, Gold Street, Northampton,
Photograph of All Saints' Church, Northampton.

Mr. Peter Skeolan, 12, Promenade Villas, Cheltenham,
Photograph of Rev. C. H. Bromley, Bishop elect of Tasmania.

Mr. Thomas Charles Bayfield, Horsham, Sussex,
Photograph of the Horsham Town Arms.

Mr. George Teague, 90, Oxford Street, Swansea,
Photograph of Rev. E. H. Squire.

Mr. J. D. Waymouth, Nailsea, near Bristol,
Photograph of Rev. Richard Wrench.

Mr. James Russell, East Street, Chichester,
Five Photographs of Dr. Hook, Dean of Chichester.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 299.—*May 27, 1864.*

REMOVED FROM PATENT OFFICE APR 1950

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FURTHER HINTS ON THE NEW CARBON PROCESS.

FURTHER experiment with Mr. Swan's new carbon process develops some singular facts in regard to the materials employed, and the reactions which sometimes arise in the course of the operations involved. Simple as the chemical fact upon which the process is based, appears—namely, the tendency of gelatine, and similar bodies, to become insoluble, when acted upon by a chromic salt, or similar body which gives up oxygen under the action of light—the reaction does not appear so uniform as might have been anticipated, and some discrepancy of experience is recorded by different operators. A very little care and practice will, probably, prevent the uncertainties and discrepancies from interfering with practical results. In the mean time, whilst they give interest to the process as a subject of scientific inquiry, and add zest to the labours of the experimentalist, we may make a few further suggestions to save the time of those who have but limited opportunity for experiment.

Keeping the Pigmented Gelatine.—Whilst the weather was cold, Mr. Swan found that the gelatine preparation, with the pigment added, might be kept ready for use in well corked bottles for an almost indefinite time. But in warm weather, the keeping qualities of the preparation appear to be considerably limited, and it may be prudent not to prepare a larger quantity than will be used in the course of a few days, or, at most, a week or two. To illustrate our meaning, we will briefly state the history of a sample in our possession.

A few weeks ago we received from Mr. Swan a bottle of the pigmented gelatine, the cork carefully tied down. We had not an opportunity of using it until several days after its arrival, and we were somewhat surprised on releasing the cork from the parchment with which it was tied, to see it immediately shoot out of the bottle like a champagne cork, and a portion of the gelatine project itself out of the aperture like a "jack-in-the-box." The gelatine, also, instead of being homogeneous and firm in texture, looked spongy. A portion of it was liquified by gentle heat, and sensitized; but, on applying it to the plate, we found it impossible to get an even film. It was full of air-bubbles of various sizes, and also of irregular shaped fibrous masses, quite clear, without any colouring matter whatever, varying in size from a pin's point to a peppercorn. Thinking it probably arose from imperfect or hasty mixing with the bichromate solution, we filtered through muslin. This improved matters a little, but not much. We subsequently tried a portion without the addition of the bichromate, and found the same characteristic prevailed; the whole mass was permeated with air bubbles, and stringy, fibrous particles of gelatinous matter without colour. Our first impression was, that these were portions of semi-coagulated albumen, which had not been filtered when clearing the gelatine solution. On communicating with Mr. Swan, however, he informed us that the gelatine when first prepared and sent off was in perfectly good condition for use. He had observed a similar decomposition in samples which had been long kept, and is now engaged in seeking the cause and remedy. In the mean time our own observations, and those of any of our readers who may have had similar experiences, may be of service in elucidating the question. Mr. Swan states that he attempted to remove these colourless particles by filtration, but did not succeed. Indeed, he found the gelatine which had undergone this decomposition became useless. We also tried filtration through two thicknesses of flannel, and, to our surprise, having just received Mr. Swan's letter, succeeded perfectly; the filtered solution was free from the slightest irregularity of either texture or colour, and the filtrate was a thick, curdled, fibrous looking mass, imperfectly mixed with some of the pigment which did not pass through the flannel.

We should have stated, that we exposed a piece of the tissue first made with this pigmented gelatine, the day after it was prepared, notwithstanding its imperfect texture, and found it quite insoluble, on subsequent treatment with warm water. Having removed the offending matter, we proceeded with some interest to make some more tissue with the filtered solution, in order to ascertain, its physical state being satisfactory, whether the chemical conditions were equally so, or whether it would again yield an insoluble film. One-tenth of its bulk of a saturated solution of bichromate of ammonia was added, and three other samples of pigmented gelatine were also made into tissue at the same time. The dark room in which they were dried being cool, and not very dry, they were not perfectly desiccated and ready for use, until about thirty hours after their preparation, when samples of each were exposed. The tissue made from the gelatine which had undergone this curious decomposition was quite insoluble in water of any temperature, whilst all the others were quite soluble and very readily developed. We tried with this tissue a shorter exposure, with similar results. We then tried a piece without any exposure at all, and found that it behaved in the water in a precisely similar manner: it was as insoluble as leather.

The question then arises, what is the nature of this decomposition, and what is its effect upon the gelatine? We have before heard of samples of tissue which were perfectly insoluble, but we had not met with any. Mr. Swan suggested that insolubility might be caused by using excess of bichromate, by heating the solution too much after the addition of the bichromate, or by the use of too much heat in developing. None of these causes could, however, obtain here. We used but one part of bichromate solution in ten of gelatine, which, in the tissue prepared at the same time, gave good results, and we have before obtained good results

by using one part in eight. It could not be heat, either in preparing the tissue or developing; for in the preparation the heat never exceeded 100°, and in developing, all temperatures, from 70° or 80° to 200°, were tried without avail. We fancied at first that possibly, being very sensitive, ordinary gas-light, by which the tissue was prepared, might have produced the insolubility. But other tissue, prepared by the same light, gave satisfactory results. The question, then, still remains unanswered. It appears certain that the character of the gelatine is altered in some way by the decomposition it has undergone. What is the nature of the decomposition? Is it putrefaction of the gelatine or fermentation of the sugar? We believe it to be the latter. Sugar in solution, and in contact with putrescent matter, will certainly ferment in warm weather, and the condition of the bottle of gelatine we have described was certainly indicative of fermentation. The products of fermentation are alcohol and carbonic acid. The question is, could the presence of either of these affect the further reactions, and increase the tendency to insolubility. In the normal reactions of the process insolubility is produced by the oxygen liberated when the bichromate is decomposed by light. Carbonic acid is very difficult to decompose in the laboratory; and yet, in the wondrous process which goes forward in the growth and nutrition of plants, carbonic acid is decomposed into carbon and oxygen. But in order to render this decomposition, light is necessary, as it does not proceed in the dark. We have in this respect an analogy between carbonic acid and chromic acid; is it possible, therefore, that the presence of the former in the gelatine increases the tendency to become insoluble? If so, it is probable that sugar may be dispensed with, and a little glycerine used in its stead. Further experiments and careful observation will be necessary to determine this, and many other points in the comparatively new field of photo-chemistry. In the mean time we shall be glad to receive the carefully recorded experiments of any of our readers in the same direction.

The Pigment or Colouring Matter.—The name of carbon process is perhaps applied to this method of printing too absolutely, as it is quite possible that some of the prints do not consist of carbon at all, and most of them of other pigments in combination with the carbon. Indian ink, the chief material used, is a pigment of very uncertain constitution. The purest and best samples which are imported from China, are said to consist largely of a preparation of the excretion of the cuttle fish, of which sepia is also made. The smell of decomposed animal matter, which liquid indian ink possesses confirms this idea. Inferior samples are doubtless carbon, and consist of the charcoal produced by the combustion of certain kinds of wood, &c. Frankfort black is, for instance, procured by burning vine twigs, &c.; Spanish black, by burning cork; other black pigments are obtained by burning peach-stones, cocoa-nut shells, ebony, box-wood, &c. Some authorities state indian ink to be the product of the combustion of camphor, or camphor-wood, and Field, a good authority, believes it to consist chiefly of a kind of lamp-black. Whatever may be its source, there is no doubt whatever of its permanency.

The most perfect results in colour we have obtained have been by the use of liquid indian ink, and a liquid permanent lake prepared for us by Mr. Newman. This gives a fine warm tint, very similar to that of a silver print. For some subjects a little blue would be an improvement, but we have not satisfied ourselves as to the best for use. The indiscriminate use of the liquid colours usually prepared for painting is not desirable as we have seen some extraordinarily granulated effect produced by their use, some chemical action having evidently taken place,

Sensitiveness, Exposure, and Visible Image.—Further experience confirms the idea that an increase of sensitiveness is the result of keeping the tissue a few days. Lessening the proportion of bichromate also decreases sensitiveness, and induces a ready tendency to loss of half-tone. In some thin films, which have been kept a few days, we have been able to perceive a very decidedly marked visible image before development, but never in thick films.

We remark, in concluding these desultory remarks, that the best gelatine we have used is that mentioned by Mr. Foxlee, at a recent South London meeting, when he gave us a sample. It is in thin strips or sheets, seven or eight inches long, and two or three inches wide, not in filaments; it is, we believe, French gelatine, and is used chiefly for varnishing the surface of prints, &c. This sample, which is very cheap, answered admirably, with the proportions stated by Mr. Swan in his paper.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Analysis, and Adulteration.

Iron.—This is the most widely distributed of all the heavy metals. It is the most important of all metals to mankind at large, and to photographers it is only surpassed in importance by silver. Although so common a metal, pure iron is one of the greatest rarities known to chemists; indeed, we doubt if perfectly pure iron has ever been seen in the compact form. Dr. Percy, indeed, states that he has some small pieces of pure iron, which have been deposited electrolytically in the process of steel facing engraved copper-plates. It is thrown down as a thin, bright, and firmly-adherent layer, and is remarkable for its bright polish. There appear, however, to be some grounds for supposing that even this iron is combined with a very small quantity of nitrogen, producing a steel-like alloy, as the presence of chloride of ammonium is stated to be essential to the production of a smooth polished steel-like surface. If this supposition be correct, we may safely affirm that chemically pure coherent iron has never yet been obtained. The process in which the above-mentioned specimens of iron were obtained is of some interest at the present time, when attention is so much directed towards the only satisfactory solution of the problem of carbon printing, viz., the production of photographically engraved copper (or steel) plates, from which good copies may be printed by machinery. In general, steel plates would be preferred for this purpose, as they would last longer without deterioration; but by the process of steel facing copper-plates, the latter could have a degree of permanence conferred upon them, which would far surpass the durability of even the hardest steel plate. The reason for this is obvious. An engraved steel plate, after several thousand prints have been taken from it, shows signs of wear, and it then gradually deteriorates without there being a possibility of restoring the plate or preventing further injury. A simple engraved copper plate, when used in the ordinary way, will be quite worn out before a steel plate is much worse than at first; but if the precaution be taken to give the engraved copper a preliminary coating of iron (improperly termed steel) by the electrotype process, before any impressions are taken from it, it may then be printed from in safety. The coating of iron is extremely thin, and in no way injures the sharpness of the impression. When the plate begins to show signs of wear (known by the copper appearing in places through the iron coating), the whole is dissolved off by a weak acid, which does not attack the copper, and a fresh surface of iron is precipitated on to the clean copper. In this manner, by taking care not to work the plate after the copper shows through the iron, any desired number of impressions can be taken from a copper plate, whilst each print will possess the beauty of a *proof*. The small photoglyphic prints which were presented to our subscribers in one of the first numbers of the Photographic News, and the more recent photo-electric engraving, were prepared in this manner, and thus the delicately etched copper plates, some of which, by themselves, would have been insufficient to produce 100 good impressions, were each rendered capable of producing many thousands of copies.

The nearest approach to perfectly pure iron met with in commerce is soft wrought-iron. Cast-iron consists of iron with from three to four per cent. of carbon, whilst steel contains one or two per cent. When melted cast-iron has a

current of air blown through it or directed upon it, the carbon being more combustible than the iron, burns away first, and the molten mass gradually becomes hard steel, soft steel, down to the quality of wrought-iron, and by stopping the operation at any particular stage, the desired quality of iron can be got direct from the pig. This process is generally known by the name of the Bessemer process. By its means, steel, which formerly required days or weeks for its manufacture, can now be made, by the ton at a time, in about fifteen minutes, provided the pig iron which they start with is free from certain injurious impurities. The presence of carbon promotes the fusibility of iron. Common cast-iron is not difficult to melt, and some varieties of hard steel require a scarcely higher temperature than cast-iron. Soft steel, which contains much less carbon, fuses with more difficulty, whilst soft bar iron is practically almost infusible. Wrought-iron possesses, along with this infusibility, a property of the very greatest value in metallurgy. It becomes pasty at a white heat, and in that state it is capable of *welding*, that is to say, two pieces will unite together, under the hammer, into one solid lump. Dr. Percy states that the purest iron which he has ever seen may be heated to redness and quenched in mercury without becoming perceptibly harder, but when carbon is present the contrary takes place, and when it is suddenly cooled from a red heat such a compound becomes hardened, being more elastic and brittle than soft iron, the hardness increasing with the proportion of carbon present. When hardened steel is heated to redness, and slowly cooled, it is softened again, and this alternate hardening and softening may be repeated *ad libitum*. Another difference between steel and iron is the effect of magnetism upon it. Soft iron retains scarcely any permanent magnetism at all, whilst steel is capable of assuming very strong magnetic properties. This appears to have some relation to the amount of carbon present with the iron.

Besides carbon, a great number of impurities are present in common iron. The most injurious of these are phosphorus and sulphur. The former imparts to iron the property of fusing tranquilly and forming a thin liquid, and is well adapted for castings, for some purposes; therefore the presence of phosphorus is not objectionable. Sulphur is a very formidable impurity, and with less than half per cent. the metal, when converted into bar iron, is perfectly useless, breaking to pieces under the hammer at a red heat. Amongst other impurities may be mentioned silicium, arsenic, manganese, aluminium, magnesium, and sometimes calcium, chromium, and vanadium. The action of these in modifying the quality of the iron is very imperfectly known.

Iron must be regarded as a very combustible metal; in fact, when in the state of filings, it takes fire with the greatest readiness, if thrown into the flame of a candle; and in a still finer state of division, it is spontaneously inflammable at the ordinary temperature in the air. An interesting experiment is, to mix loosely together on paper about equal bulks of gunpowder and iron-filings, and then, having poured some spirits of wine into a plate and lighted it, to sprinkle the mixture into the burning liquid. The greater portion of the iron will burn on coming in contact with the flame, with the peculiar scintillations which characterise its combustion; but the gunpowder will drop through the flame unignited, and may be collected into a heap and fired when the spirit has burnt off. The reason why iron in mass does not continue to burn when heated in the air is, that the heat is too rapidly carried away by conduction or radiation. In oxygen gas, however, which produces greater heat, the combustion of the iron will go on until the metal or the gas is all consumed. Indeed, a bar of iron, heated to whiteness, will burn even in the air, if the blast of the bellows be strongly directed upon it, or if it be swung rapidly round.

Dissolving India-rubber.—It should be known to photographers that American petroleum will answer as a solvent for india-rubber as well as benzole, and that it costs less than half the amount.

THE IMPORTANCE OF PHOTOGRAPHY IN ARCHÆOLOGY.

BY W. WARWICK KING.

As the season for out-door photography has already begun, and men are thinking about their holiday excursions, I wish to direct the attention of photographers to a class of subjects not generally noticed by them; I mean those architectural remains which former ages so freely scattered over our land; and there is especial need at the present time for photographs of our antiquities. The rage for restoration, falsely so called, has begun. A process which, with few exceptions, consists in obliterating every feature of interest which a building may possess, and making the whole structure appear as if fresh from the hands of the builder, mason and glazier, directed doubtless by an architect in some town or city, who cares but little for the fabric he so ruthlessly damages. An instance of this lately came under my notice: I was visiting the parish church of St. Mary, Eling, Hampshire, a place known to me from boyhood, I hoped to secure a photograph of it; but judge of my astonishment when I saw the building looking new. It had been "restored;" a beautiful Decorated window at the east-end of the south aisle, which, when I saw it last, capable of preservation at a comparatively small expense, was gone, and a poor copy substituted; and, as if this was not enough, the architect had erected a shallow stone porch, utterly in defiance of the architectural character of the county. It was not the old church which I wanted, but a new building, erected without care or thought, and utterly ignoring any reverence for the past. This is only one out of the many instances. Call to mind the Guesten Hall, at Worcester, destroyed by the Dean and Chapter there, a proceeding which, when first suggested, called forth from Mr. Beresford Hope a remark that the mere idea ought to be received with a howl of execration through the land. Next the destruction of Bishop Ken's house, in the Close of Winchester Cathedral. Turn over the old numbers of the *Gentleman's Magazine*, and the *Builder*, and how often do you see notices of buildings about to be demolished or lately pulled down. And what is it that these restorers and destroyers are doing? Neither more nor less than utter damage to ancient art—art so often used, that the smallest and most hidden corners of our old cathedrals and abbeys give evidence of its application. Men, in former times, studied no cost in adorning houses dedicated to the service of God, but filled them with forms of the most exquisite taste; and we, who see them in their present whitewashed state, like bleached dishonoured skeletons, can scarcely imagine what glory they must have possessed before the hand of the reformer, in his ill-judged zeal, mutilated them; still the little that remains tells what the whole must have been, and that little should be treasured as a thing of priceless value. Having shown, as I trust, that there is something to interest men in our relics of antiquity, I hope I may not appeal in vain. What would we not have given for photographic representations of the buildings that are lost to us: let us, therefore, take care of what remains, and do our best to perpetuate its memory, at least by means of our art, not in simple stereo slides, for they are almost useless to the archæologist, but on larger plates, which yield abundance of detail, so needful to determine the precise character of ancient work. It, doubtless, will be said that I insist too much on architectural, in preference to landscape photography; but I think I have good reason for so doing. The landscape photograph is beautiful, but we look at it and pass it by having no associations of historic character. It may, as Alexander Smith says, be

> As poor as the Amazon,
> That, for all the years it has rolled,
> Can tell but now fair was the morning red,
> How sweet the evening gold.

But think of our ancient buildings. How easily, by the aid of archæological science, can we make the dry bones live, and invest them with an absorbing interest. The church, with its varied services; the castle, with its knights and barons;

and even the very tumuli, with the men who raised them. The smallest church has a history of its own which reveals itself to the archæologist, and reminds him, if of nothing else, of the piety of former ages, and of the times of those who raised it.

I trust this year that amateurs especially will give us architectural photographs as the result of their work, and if anything I have said will conduce to that end, I shall be satisfied.

DRY COLLODION.

BY M. L'ABBE DESPRATS.

(Continued from p. 78).

Preliminary Developers.—It is necessary to repeat that the operations which follow are the most delicate of the process; but if, setting aside for a moment all personal inspiration, the operator will restrain himself to scrupulously following the indications hereafter given, the whole of the operations will really be only mere pastime to the practised photographer, but, nevertheless, they must be strictly followed.

The plate, after being exposed in the camera, is taken hold of by the corner by which it was held while being collodioned. With the other hand pour over it a mixture of equal parts of alcohol and pure water. This proportion must be strictly observed: more alcohol would partially dissolve the film; less alcohol would render the solution less penetrating. The alcohol we employed was 36 degrees. The diluted alcohol is poured over the plate in the same manner as collodion. The plate being thus moistened, in some measure instantaneously, with a light humid film, is balanced in every direction during the space of a minute, then drained by the same corner as the collodion. The excess of dilute alcohol which has drained off must be thrown away. The plate being put upon the tripod, it is well covered with pure water, which will form a thick layer, in consequence of the difficulty the water experiences in mixing with alcohol: but in the course of a minute or a minute and a half, mixture will take place, and the water will penetrate the collodion film. At this moment the greater part of the water must be poured off the plate, and what remains must be spread over the film as equally as possible. Lastly, the plate is slightly drained.

Second Sensitizing.—For this operation we have spoken of a weak silver bath of 2 per 100. We can begin with a bath of this strength; but after a little experience, a bath of 6 or 8 per 100 will be preferable. Only we must never lose sight of the necessity for always employing the bath perfectly new. A supply bottle must be kept to provide the necessary quantity for each operation.

We now remove the plate to a bath of pure water. Then taking it by the corner as before, we pour on the opposite and raised corner a small quantity of the nitrate bath sufficient to cover the plate, as equally as possible, taking care that the liquid does not touch the fingers. The action of this second sensitizing thus conducted should be continued as long as the first, that is, two minutes. The excess of this layer of silver solution is poured into a heated glass, but not into the stock bottle, the contents of which would be damaged by the mixture. This excess will serve afterwards, if required, to strengthen the picture; if not, it may be thrown among the residues.

We have now brought the collodion film to the state it would have been in if produced by the moist process. Only the nitrate bath that covers it seems a little less adherent, and requires more management to be retained on the plate in a regular uniform manner. Thus treated, the nitrated film cannot be submitted to the developing solution only upon taking the most delicate precautions. There we shall now describe.

Pyrogallic Acid Developer.—We have previously advised a mode of developing which appears to us excellent, and even necessary for plates of large dimensions. This method consists in immersing the sensitized plate for the second time into the pyrogallic solution, exactly in the way the plate is sensitized in the silver bath. The picture soon begins to appear, and when the principal points are indicated all over the plate, proving that the developing solution is uniformly mixed with the nitrate, the plate is placed on the tripod, and then covered with a sufficient quantity of the developer, and proceeded with as in treating a wet collodion plate, until all the effect desired is obtained.

For plates of small dimensions this method is not so necessary. The plate covered with the nitrate solution is placed upon the tripod, and lowered on one side, then at the upper side pour on a sufficient quantity of the developer to cover all the plate as lightly and regularly as possible, without stopping. The liquid must not be poured from a height, it would be preferable that the mouth of the bottle be large and even, and touch the collodion film, so that the liquid should flow out and cover the film at once, if possible. A band of bibulous paper applied on that side of the film upon which the developing solution is poured will facilitate this very important manœuvre. To make the importance of this understood, we may say that if the developing solution arrives on the film from a height, the nitrate will be driven off at the place where it falls, and that at this spot, and beyond, even, it will no longer be possible to develop the picture. The band of paper retains the nitrate, and must be removed as soon as it has become impregnated with it. Immediately the developer has covered the plate the picture will begin to appear, and will be completed by the same means and under the same conditions as in the moist method. Generally, if the bath employed for the second sensitizing is of the strength of 6 or 8 per 100 it will be useless to have recourse to various modes of intensifying. It is, therefore, possible by the dry method to obtain at the first essay a negative in its full strength; and this is also a sure sign that all the operations have been well conducted. We do not hesitate to assert that a weak negative obtained by the method we have described will not prove that this method is defective, but rather that it has not been strictly followed.

Many will doubtless be tempted to say, so many washings will affect the texture of the collodion film. Upon this point we can fully satisfy the operator. It is upon removing the plate from the first sensitizing bath that the film is liable to come off, and most frequently at the same corner where the collodion drained off, and where the film is thickest. If this accident happens at the commencement of the washing in pure water, it is useless to go on working with the plate, for the water, holding some nitrate of silver in solution, will penetrate the film, and obstinately remain to spoil everything, sooner or later. We must, therefore, take the precaution of well draining the collodion, and especially to give it sufficient time to set thoroughly. We have remarked that in winter a pause of five minutes will not compromise either the sensitiveness of the film, or its solidity; on the contrary, the latter will be increased; but the plate must not be held in the hand all this time, the heat radiating to a distance from the corner by which it is held, rendering the film too dry, it will be sure to come off the plate in the bath.

As to the action of the baths necessary for development, they are in no respect compromising. We have already stated, in a preceding article, that alcohol possesses the property of intimately penetrating the film, especially if it be perfectly dry, and as it is afterwards replaced by water, it is clear that an irregular and unequal contraction becomes impossible, which must take place if the film moist on the surface remains dry and contracted beneath. Let us say, further, that, in the same manner, when the plate is placed to repose on the tripod, the baths act only on the upper surface of the film, the resistance of the corners prevent their penetrating beneath; we remark, in fact, that the edges of the plate always remain dry, and we must also take special care that the liquids are not too far removed from it. We are happy to be of exactly the same opinion on this circumstance as our honoured friend M. Brebisson, upon whose

authority we may always depend in truly practical matters. If, then, we must express regret at not having, up to the present time, repeated all the experiments of his instantaneous dry process, our regret is a little soothed by the thought that, by following the method indicated, we believe it be possible to attain the aim to which those who follow it will certainly arrive; but as the method of the two parties are different, we have also thought it best to leave the operator liberty to chose, a liberty we should be happy to enjoy ourselves when circumstances permit.—*Le Moniteur de la Photographie.*

THE FRENCH PHOTOGRAPHIC EXHIBITION.

The sixth Exhibition of the French Photographic Society opened to the public on the 2nd inst., rather prematurely it would seem, for no catalogue is yet issued. So marked, however, is the artistic character of the leading exhibitors that no difficulty exists in distinguishing each one's productions, or in rendering unto Cæsar the things that are Cæsar's. All arguments as to whether photography is an art are effectually silenced and answered affirmatively by an inspection of the works now exhibiting. Just as the connoisseur in a gallery of "Madonnas" exclaims, "That's a Guido," or "This is a Correggio," or "Here's a Raffaelle," so you hear in this photographic gallery exclamations from the keen amateurs around you of "This is a Gaillard," "That is a Jeaurenaud," "Here is Ferrier," "There is a Davanne." I do not select these names invidiously, nor as possessing exclusive merit. I jot them down as I heard them, remarking to myself, "The artist in photography, as in all other arts, is known by his works."

The exhibition fully represents the present advanced state of photography: every phase of progress, every stage of improvement, has its votaries. French productions, of course, greatly preponderate, but other nations are represented, and England more completely so than any other foreigner. The palm of excellence in landscape photography, so long borne by British photographers, is now warmly disputed for by our native artists. Mr. Vernon Heath and Mr. Robinson will have some difficulty in retaining their laurels in presence of the beautiful productions of Davanne, Ferrier, Rousset, and many others whose works possess singular merit.

In the absence of a catalogue it will be impossible to particularise all the works separately. I must, on this occasion, limit myself to a general survey of the exhibition, and note its leading characteristics. First, as to the portraits, which are not so numerous as in former exhibitions, and are for the most part retouched. This element in their production entirely removes them from photographic criticism; as photographs they are spoiled, while they possess no claims to be considered as paintings. The rage for these mongrel nondescripts is not very creditable to the taste either of the public or the photographer; it is to pander to the love of prettiness, no matter at what sacrifice obtained, that these disguised photographs are produced.

Let it not be supposed, however, that all the portraits are liable to this censure. There are many very beautiful and truly artistic photographic portraits, from the hands of Bayard, Berthall, Hanfstaengel, and others. Of enlarged portraits, there are some very fine specimens, which I recognise to be by MM. Bourdier, Numa Blanc, and Liebert. M. le Comte Aguado has sent a series of marine views, enlarged from the negatives, and although slightly defective from the length of exposure required, are still very beautiful.

The views exhibited are, for the most part, very excellent. I must particularly note two admirable views of Paris by M. Soulier, remarkable for the aërial perspective they display; they are transparencies, and, truly, dioramic pictures. M. Carlemann, a Swedish artist, exhibits some views of very large dimensions, printed on a single sheet of paper; and M. Godard, of Geneva, sends a very charming collection of nautical scenes on the lake of Geneva, besides a view of that port, of great beauty.

M. Cammas sends a series of views in Egypt, printed from paper negatives; these are of remarkable excellence, it is difficult to believe that they are not lithographs, they possess so much solidity and vigour; atmosphere has something to do with the wonderful chiaroscuro and relief displayed in these works. Mr. Robinson, of Leamington, exhibits a picture of large dimensions, in which he fully sustains the high character his productions have previously attained. Perhaps the gem of the exhibition, in the class of views, is a collection of 33 pictures, 12 by 10, unnumbered and unnamed, but which are evidently English subjects; they surpass any and everything hitherto exhibited of the kind, in the representation of herbage and foliage; they belong to Nature's pre-Raffaelite school, and do the artist infinite credit. I regret that I cannot give his name. I shall not be surprised to learn that they proceed from the hands of an adept in the tannin process.

An immense table placed in the centre of the exhibition is covered with the productions of that wonderful art, photo-sculpture—statuettes, busts, and medallions. As may be supposed, these works excite much interest and curiosity. Critics are not agreed upon the artistic claims of these productions; some among them will not allow that they possess aught but mechanical excellence, and could be produced just as easily, and as good, without the aid of photography at all.

The great desideratum and final aim of photography is the production of the photographic image in indelible carbon printing ink. Specimens of the various processes by which that result is sought to be attained are in the exhibition. Bitumen is represented by MM. Lerebours and Barreswil and Davanne. Bichromated gelatine, by M. Lemercier, with M. Poitevin's process. At present, the superiority is with the bitumen process.

Photographic engraving exhibits no sensible progress. I have not recognized, as I hoped, any specimens of Mr. Dallas's process. The attempts of Mr. Pouncey and M. Poitevin are rather promises of future excellence than of present success. The enamels of M. Lafon de Camarsac are of singular beauty. As in the Royal Academy, in Trafalgar Square, we used to see, on the opening day, crowds of connoisseurs jostling each other in impatient crowds around the Turners and the Landseers, so here, on a smaller scale, it is true, we see similar groups congregated around the very beautiful specimens of carbon printing sent by Mr. Swan. It is impossible to imagine anything more perfect. Without taking into consideration, on the present occasion, the process by which they are obtained, it may be said that they even surpass daguerreotypes, in delicacy of chiaroscuro and transparency.

Madame Laffon exhibits specimens of photography on silk, which we consider, with all deference, a misapplication of the art, seeing that the excellence of the photograph consists in the perfect delicacy of detail, requiring even a more homogeneous surface than paper, whereas the textile character of silk must give a ground of so uneven a quality as to render delicacy of detail impossible.

The "Hanging Committee" have admirably acquitted themselves of their task. Most of the pictures are hung "on the line," and, moreover, they are appropriately grouped together in separate compartments, one for foreign productions, another for enlarged pictures, another to specimens of the various toning processes, another to the pictures sent for competition for the Duc de Luynes' prize, &c., &c. This excellent arrangement enables the visitor to make ready comparison of the merits of each, and of the progress realized in every department.

WASHING PRINTS.

Mr. J. Cockin, a correspondent at Dartmouth, suggests a method of washing prints which involves the principle of alternate washing and draining, which is undoubtedly one of the utmost importance for securing the entire elimination of the hyposulphite, so difficult, if not impossible, to remove

by merely prolonged soaking even in running water. He says :—

Sir,—My idea is that a wheel made on the same principle as a water-wheel in which the *buckets* would contain the photographs to be washed would revolve by the weight of the water in the buckets, the photographs being prevented from falling from these as the wheel revolved by several rods either projecting from the sides of the bucket or by a covering of metal network. As the wheel revolved the buckets would empty themselves, and thus the prints would, by every revolution, be alternately floated and then drained. If I understand Mr. Williams's instrument rightly, he uses the motive power merely to cause a change in the position of the prints, which are placed inside a revolving drum. The principle of motion is the same, but the treatment of the prints is very different. Which plan would be most successful in freeing them from hypo, perhaps only experiment can determine.

P.S.—The wheel is the only essential part of the apparatus. The trough in which it is made to work is merely a contrivance for carrying off the waste water.

A somewhat similar idea was recently communicated to the *American Journal of Photography* by Mr. F. Webster as follows :—

Take a water trough of any length and width wanted, on the middle of each side make an axle bearing on them, place a drum, made by fastening eight light spokes to an axle, and on the spokes thin boards; now take a sufficient number of pine buttons, about an inch square, and screw them to the drum at such distances apart that the corners of the print may just rest on the corners of the buttons, now fasten the prints to the buttons with varnished mapmakers' tacks, cause the drum to be revolved in the water, each print is nearly all exposed to the water, and I find the alternate washing and draining of the print to be very effective in dispossessing the hyposulphite of soda.

I have a tin water-wheel, and the axles of the drum and wheel connected with a belt, and the water, after washing the prints, is sufficient to revolve the whole apparatus.

The question which arises in using either method is how far it is applicable to work on a large scale, as in order to carry out the principle with efficiency the prints must be attached to the wheels singly and not in parcels of three or four. Making a hasty estimate, we calculate that with a wheel of two or three feet radius, and say four feet wide, about sixty 12 by 10 prints could be washed at once, and as three or four hours would be sufficient to complete, a good many might be done in a day. A slow revolution, so as to secure time for draining, would give the best result.

POSITIVE PRINTING WITHOUT SALTS OF SILVER.

BY M. OBERNETTER.

While I was working in the laboratory of Herr Joseph Albert, of Munich, I had occasion to study the defects of the photographic processes. To two of these I have since devoted all my attention, namely, the permanence of the proofs, and the great consumption of silver.

If we arrive at preparing carbon pictures as beautiful and in as easy a manner as silver pictures, both these defects will immediately disappear. We possess, it is true, methods which furnish proofs in carbon as beautiful as those in silver, but all those who are occupied in the production of these proofs, know how uncertain it is. Still, I am fully convinced that we shall finally succeed by this method, and I am myself one of the numerous experimentalists who seek the solution of this problem.

Herr Albert consumes in his atelier, 300 pounds of silver annually. This enormous consumption, the result of the work of a single establishment, has led me to seek the means of arriving at the same photographic result by excluding this precious metal from the operation. In profiting by the encouragement M. Albert gave me, and by the facilities afforded by his splendid laboratory, I have arrived at the following results.

Take the ordinary photographic paper, unsalted, and float it upon the following solution.

Water	1,000 parts
Solution of sesquichloride of iron (sp. gr. 1·53 to 1·6) ...	13 ,,
Crystallized chloride of copper	100 ,,
Hydrochloric acid, pure and concentrated	12 ,,

The paper is allowed to remain two minutes on this solution, then drained, and hung up to dry.

This operation may be performed by diffused daylight, without inconvenience.

The properties of paper thus prepared are very remarkable. Two sheets, prepared two years ago, furnish now the same results as when recently prepared. Their sensitiveness is at least one-third superior to that of albumenized paper.

After exposure in the printing frame, no picture is perceptible; or if it be visible, it is very weak in colour. We must, within an hour or two's delay at the most, develop and fix them by the method about to be described; else the vigour of the proofs will rapidly diminish. Twenty-four hours after exposure, the property of yielding a picture has so completely disappeared, that the paper will serve for fresh printing. It is this property which permits of preparing the paper by the light of day.

Upon removal from the printing frame, the invisible picture is fixed in the following solution.

Water...	1,000 parts.
Sulphocyanide of potassium...	8 to 12 ,,
Concentrated sulphuric acid ...	1 part.
Sensitizing solution	10 to 20 parts.

We float the proof upon this solution for three or four minutes, the printed side downwards, taking care to disturb the liquid as little as possible; it is then immersed, and a fresh proof put into its place; and we continue to proceed in this manner until the lot of proofs is all immersed, or until the liquid will hold no more. From time to time, add a small quantity of the solution to the bath, so as to maintain its original strength. The older the bath, the quicker it acts.

Cyanide of copper is precipitated upon the parts attacked by light; and the quantities precipitated are exactly in proportion to the intensity of the photogenic action. The half-tones, even the most delicate, are thus reproduced.

The time of immersion in the bath is not fixed; it depends upon the course adopted in the series of operations; it may vary between the limits of five minutes and half an hour. Still, if we leave the proof in the bath too long, twenty-four hours, for example, the picture shows itself in relief. By operating thus, I have obtained proofs in which the deepest shadows were not less than two lines in thickness.

When the proofs have remained a sufficient time in the solution, they are immersed in ordinary water, and left in it from a quarter of an hour to an hour, or even more. In any case, an hour will be sufficient; it is as well to change the water several times. The proofs may then be dried without any risk, and the following operations may be pursued when found convenient.

At this moment, the proof is formed of cyanide of copper, and we can make this salt undergo all the chemical changes desired, until we find one that communicates to the proof a colour and stability similar to those in proofs in silver.

Different processes may be employed to communicate the desired hue to the proof.

I shall examine in succession these different processes, and give, naturally, the preference to those which yield the most beautiful and permanent proofs.

1. The proofs, upon being removed from the water, are placed in a solution of ferrocyanide of potassium, the strength of which may vary between 6 to 12 per 100. In this solution, they assume a red tone, which increases the intensity. If the immersion be prolonged all night, the hue is a deep

red, of a splendid velvety quality, and the whites are perfectly clear. But we must not proceed in this manner, when we specially desire to obtain this colouring.

To obtain the agreeable hues of ordinary positives, an hours immersion will suffice.

Immediately the proofs have acquired the desired colour, they are removed and washed in several waters, which are renewed until the last is not tinged yellow. This operation requires from a quarter to half an hour only.

It is upon immersion in the following solution that the proof acquires the true colour of positives :—

Water...	... 200 to 300	parts
Protosulphate of iron...	... 100	„
Sesquichloride of iron	... 40	„
Hydrochloric acid ...	... 80	„

In this bath the proof passes successively through the following hues: red, violet, purple, blue violet, black, and greenish black. Immediately it has acquired the desired colour, the sheets are washed in acidulated water and dried. The finest purple violet hues are obtained by leaving the proofs in ferruginous solution until they have become of a greenish black hue; they are next slightly washed in water, then floated a moment upon a dilute solution of sub-acetate of lead.

We give to these proofs the brilliancy of albumenized papers, by first drying them, and then floating them upon a solution of albumen, which is afterwards coagulated by heat. I have in this manner prepared proofs of very large dimensions, which the most skilful photographers have taken for beautiful positives in salts of silver.

I explain the reactions which take place during these operations in the following manner :—

There is, upon the paper, sesquichloride of iron $Fe^2 Cl^3$ and chloride of copper Cu Cl, the latter in excess. The light, in passing through the negative, reduces the sesquichloride $Fe^2 Cl^3$, to protochloride Fe Cl, while the chloride of copper Cu Cl undergoes no modification.

If the sheet, after exposure, is placed in a dry medium, the picture remains; but if it be put into a moist atmosphere, the protochloride of iron Fe Cl attracts humidity, and is decomposed in such manner that sesquichloride of iron $Fe^2 Cl^3$ and protochloride of copper are re-formed at the same time.

When this reaction has commenced, if the proof is not immediately immersed in a solution of sulphocyanide, the protochloride of copper Cu^2 Cl reaches its maximum, and the paper, by a fresh exposure to light, may serve for a new picture.

If, on the contrary, and while the protochlorides Fe Cl or Cu^2 Cl are present, the proof be immersed in sulphocyanide of potassium, sulphocyanide of copper is immediately precipitated upon the reduced parts, while upon the parts not reduced, sulphocyanide of copper is formed, which dissolves in the sulphocyanide of potassium in excess, and is decomposed by contact with water, yielding insoluble sulphocyanide of copper, which is deposited upon the parts already covered with this salt.

Frequently, upon being removed from the solution, the proof appears yellow; this is a sign of the formation of a sulphocyanide and double cyanide of copper. This yellow hue disappears in the washing, because, in this state of extreme division, this salt is completely decomposed by contact with water, yielding insoluble sulphocyanide of copper. The red colour of the proofs is due to its transformation into ferrocyanide of copper. The violet colour is due to a partial formation of Turnbull's blue.

2. By means of this method I can obtain carbon prints. After having withdrawn the proofs from the water, and partly dried them, I expose them to an atmosphere of chlorine or of oxygenated compounds of this gas (obtained by the action of concentrated sulphuric acid upon chlorate of potassa)*. Under this influence the sulphocyanide of copper is converted into the chloride. Now, it is known that a sheet of paper impregnated with a metallic salt is readily carbonized under the influence of heat, while in ordinary conditions it will sustain a high temperature. Thus it is sufficient to carry the paper thus partially impregnated with chloride of copper to a temperature of 300° to 340° for it to become carbonized.

We place the proofs in a tin box, and heat it to 390°. The half-tones thereupon develop themselves in a chesnut brown hue. This carbonization sometimes renders the paper brittle, still it possesses sufficient tenacity to admit of its being glued to a cardboard.

3. We can also, upon removing the proofs from the washing water, immerse them in an ammoniacal solution of permanganate of potassa, according to Dr. Phipson's method. They are then developed of the well-known brown colour. In this case, the exposure must be curtailed.

4. Good proofs are also obtained by passing the proofs into a weak solution of nitrate of silver. The exposure must then be very short; the addition of acids modifies the colour. By afterwards washing in water containing a little oxalate of ammonia, the picture acquires a velvety tone, and is fixed at the same time.—*Photographisches Archiven.*

* A very dangerous experiment in the hands of the inexperienced.

Proceedings of Societies.

North London Photographic Association.

The last meeting of the present session was held in Myddelton Hall, on the evening of Wednesday, May 18th, Mr. G. Shadbolt in the chair.

The minutes of a previous meeting having been read, the following gentlemen were elected members of the Society: Mr. J. Reed, Mr. J. Peake, Mr. J. J. Cole, and Mr. V. Selb.

The Chairman called attention to the following articles sent for exhibition :—A print, on a 6 by 5 plate, by Mr. Ross's triple stereo lens, of 4½ inches equivalent focus, and some reproductions by the 18-inch focus triple, of the same maker; to some prints for the album, by Mr. Nicholson, taken with Grubb's lens; to a large cradle bath, made by Ottewill and Collis, the plate glass bottom being in one piece bent to an angle, instead of two pieces joined.

Mr. Wharton Simpson exhibited some prints by Mr. Brothers, of Manchester, the negatives of which had been taken by the magnesium light. (See p. 241 in our last.)

The Chairman said, perhaps members would give their opinions as to which was by the magnesium light, and which by sunlight, of two pictures of the same subject, taken respectively by these lights, in the same time, and under similar conditions. Some doubt seemed to prevail on the subject and opinions varied. It was then explained that the apparently least exposed negative was by daylight.

After an explanation of the method adopted by Mr. Brothers, and some conversation on the subject,

The Chairman called attention to a portable tripod levelling stand, the three legs of which, working on one centre, could be folded together. Also, to two works issued by Mr. Frith, entitled "The Gossiping Photographer on the Rhine," and "The Gossiping Photographer at Hastings."

The Chairman announced that the album had just arrived with the mounted prints, from Mr. Fox, who stated he would have pleasure in mounting any others, when contributed.

Mr. W. W. King made some observations on the importance of photography, in preserving archæological records, and recommended photographers to give attention to historical buildings in preference to producing landscapes only. (See p. 255.)

After some conversation on the subject,

The Chairman exhibited some transferred negatives sent to him by Mr. Wenderoth, of Philadelphia. He remarked that Mr. Swan had recently done good service in calling attention to the facility with which negatives could be transferred. It was somewhat curious, that those he had just received from Philadelphia, had been transferred some months previously, by an almost identical method. He thought it must be of great advantage to professional photographers in strong negatives, as the accumulation of glass must be something tremendous. Mr. Wenderoth prepared the glass with a very thin film of beeswax,

by which he was to remove the film in subsequent operations with the greatest facility.

Mr. Hislop asked if it would not have a tendency sometimes to make the film leave the glass before it was wanted: in the bath, for instance.

The Chairman thought not. It moreover enabled the operator to dispense with cleaning the plate carefully.

Mr. Simpson thought that this was a point of vital importance The facility of interposing a film of some inert substance between. the collodion and an imperfectly cleaned plate, would often be most valuable.

After some further conversation on the subject,

Mr. How called attention to his new tent, and illustrated the facility with which it could be erected or packed up.

The presentation print, which consisted of a very fine view of Bedford, entitled "The Brook, Kenilworth," was then distributed.

After some votes of thanks, the meeting adjourned until the 21st of September next.

Photographic Society of Scotland.

We find from the *Society's Journal* that the new carbon process was discussed at the last meeting of this society, held on the 10th inst. Mr. C. G. H. Kinnear in the chair. After a paper describing a method of washing, by Mr. Abbett,

Mr. T. B. Johnston read some "Notes on Carbon Printing," as follows:—

My attention has been called by Mr. Rodger, of St. Andrew's, to the similarity that exists between Mr. Swan's carbon process and that by M. Poitevin, as afterwards modified by M. Fargier, for which he received a medal of 600 francs from the French Committee in July, 1856.

In the Photographic News for December 14, 1860, I find, under the head of "Foreign Science," the following, from their Paris correspondent:—

"M. Fargier has patented a new printing process; but yet not entirely new, inasmuch as he avails himself of the photogenic action of light on a mixture of gelatine and bichromate of potassa, with the addition of carbon in powder.

"His method is based on a very simple but important fact, viz., that when a transparent sensitive medium is exposed to light, the chemical action and change, commencing at the surface of the sensitive medium, penetrate more or less into its substance, in proportion to the length of time it is submitted to the action of the light. Consequently, when he has obtained a picture on a layer of gelatine, containing powdered carbon in a state of suspension, and sensitized by bichromate of potassa, M. Fargier pours some collodion on to this picture, and then plunges the plate into warm water. The glass becomes detached, the gelatine melts, *under the image*, and there remains on the collodion only those portions of the bichromate, more or less thick, according to the intensity of the light, and which have become insoluble. In this way the picture is really transferred to the collodion in all its detail; for the surface remains exactly as the light has made it. The picture is next glued to a sheet of paper, collodion *uppermost*. In this way M. Fargier obtains positive pictures so fine in model and tone, that proofs taken from the same negatives by ordinary methods cannot be compared with them."

On the 19th of December, 1860, he writes:—"In my last letter I described M. Fargier's process of carbon printing; the results are truly admirable, both from the purity of the lights and the delicacy of the details of the image, very superior to the positives obtained by the ordinary methods; being printed with pure carbon, they are undoubtedly permanent."

In the News for January 3, 1862, the Paris correspondent writes:—"M. Fargier has made some important modifications in the original process; he found the sensitiveness of the bichromate of potassa so great that one or two seconds' exposure was sufficient to solarize the proof; he then substituted nitrate of uranium, bichromate of ammonia, &c., for the salt of potassa, and then obtained better results. The exposure could then be prolonged several seconds without danger. The manipulation of the collodion-films is also performed with much more freedom."

Mr. Rodger says:—"The only difference between this process and Mr. Swan's is, that M. Fargier prints on the film of gelatine and carbon, and then pours on the collodion, and thus draws the film off. From my experience of the last month, I should rather follow the details of this process in preference to those of Mr. Swan's, and print while the material is flat on the glass; for I find that the film of gelatine is very apt to adhere to the printing-frame back, by reason of the heat."*

* No such danger need exist if the tissue be properly dried before use. It would, in any case, be easy to obviate by placing a piece of soft paper over the gelatine surface, which would not interfere with subsequent operations.—Ed. P. N.

Mr. Rodger, two or three years since, made a series of experiments by this process. Many of the prints so produced were quite perfect, but, unfortunately, not being preserved with sufficient care, very few of them now exist. He sends me one impression, not a perfect one certainly, but it is enough to prove that prints, by a process very similar to Mr. Swan's, were produced several years since.

Those who desire more information on the subject will find full particulars in the following journals:—Photographic News, Dec. 14, 1860, Dec. 21, 1860, Jan. 11, 1861, Jan. 3, 1862; *Photographic Notes*, Nov. 15, 1861, June 1, 1862; *Journal of Photography*, June 2, 1862.

Mr. Tunny exhibited to the meeting several portraits printed by him, with slight modifications of Mr. Swan's carbon process. The prints were of good quality, equal to these produced by silver; and Mr. Tunny thinks, with a little practice, carbon prints can be produced with certainty and great rapidity; he advocates the use of a much thinner film than that recommended by Mr. Swan.

The Secretary then read the following report by the Council:—

The Council, in accordance with the laws of the society, have now, at the conclusion of the eighth year of its existence, to present their annual report to this meeting.

The Council have much pleasure in congratulating the members on having obtained the consent of His Royal Highness the Prince of Wales to be the patron of the society, in room of his late father, the lamented Prince Consort.

The Council, on the other hand, regret that so few ordinary members have been added to the list since last annual meeting. They think it their duty to remind the members that no society can long continue to prosper without a constant accession of new members, to fill up the blanks which must arise from deaths and resignations. They would therefore urge upon the members the necessity of recruiting their ranks by endeavouring to induce all their friends who take an interest in photography to join the society.

The papers read during the session have been more than usually interesting, and the attendance has been satisfactory.

It may be of use, as a guide to future operations, to remind the society of what has been done during the session, which closes to-night; and the Council therefore present a short *resume* of the business which has been brought before the society, the chief communications being as follows:—

Some Remarks on the Malt Process, by the Rev. D. T. K. Drummond.

On the Stereoscopic Relief of the Chimenti Pictures, by Sir David Brewster.

Carbon Printing on Plain Paper, by Mr. W. Blair.

On the Photo-microscope, by Sir David Brewster.

Description of an Improved Enlarging Camera, by Signor Antonio Montagna.

On a New Camera and Dry-Plate Apparatus, by Thomas Sutton, B.A.

On the Use of Magnesium Wire in Combustion as a Photographic Agent, by Sir David Brewster.

Description of a New Washing Apparatus for Photographic Prints, by Mr. John Sang.

Popular Notes on Photographic Lenses.—Part II. Landscape and Architectural Lenses, by Mr. J. T. Taylor.

Description of a New Arrangement for Washing Photographic Prints, by Mr. James Abbot.

The Council may also refer to the experiments of taking portraits by the new light produced by the combustion of magnesium wire, which were conducted at a late meeting by Mr. Moffatt. Although these experiments were quite successful, this brilliant light, for many reasons, can never compete with daylight for portraiture; but on the other hand, it may be of great value to illuminate dimly-lighted interiors; for taking copies of paintings, which cannot be removed from the walls; or for taking views in the interiors of mines, caves, or other situations where daylight scarcely enters,—such as the temples at Elephanta, or the interiors of the Pyramids.

The most important discovery of the session has certainly been that of Mr. Swan's improved carbon process, which seems to combine all the beauty of silver printing with the permanency of printing ink. Through the kindness of Mr. Swan, specimens of his new process were lately exhibited to the society, which has ever taken a deep interest in the discovery of a permanent process, and has already awarded a medal to Mr. Pouncy, as well as been the medium of publishing a description of Mr. Blair's plain-paper carbon process.

The competitive exhibition of this season was the means of bringing together a number of beautiful prints, sent from every part of the country—a proof that a medal from this society is valued as one of the highest rewards a photographer can attain.

The exhibition was open for one month to the public, free of

charge, and it must be gratifying to the society that the exhibition rooms were well attended, and that many regrets were expressed when the exhibition was closed. The gentlemen appointed by the Council to award the prizes were unanimous in their opinion as to the merits of the pictures selected for rewards, which were as follows:—

For the best landscape, the silver medal was awarded to Mr. P. Robinson, of Leamington, for the "Deer Park, Stonleigh;" and Mr. Robinson also carried off another medal, for the best group, "Somebody's Coming."

Mr. Moffat, of Edinburgh, was the successful competitor for the best portrait, that of "George Harvey, R.S.A.," for which he received a silver medal.

A bronze medal was awarded to Mr. F. Bedford, of London, for his view of "Warwick Castle;" and another bronze medal to Mr. Rodger, St. Andrews, for his group of "Colonel and Mrs. Maitland Dougal."

The Council have entered into an arrangement with Mr. Robinson for the supply of copies of the prize group, "Somebody's Coming," which will be delivered to all members of the society who have paid the current year's subscription, as soon as the required number can be printed.

Successful as the competing exhibitions have hitherto been, the Council are unanimous in their opinion of the desirableness of having next season, if at all practicable, a general exhibition. They find that a comparatively small number of photographs, however high in quality, has not the same attraction, either to the public or the society, as a more extensive collection; whilst the fact of its being a competing exhibition excludes many pictures of undoubted merit, which would be sent without hesitation to an open exhibition.

The only obstacle is the want of a suitable room in a good locality; and the Council call upon every member of the society to assist them in overcoming this difficulty, so that arrangements may be made in good time for next session.

For next year, the Council would recommend that silver medals be awarded as follows:—

For the best view, taken by a dry process; the details of the process to be communicated to the society.

For the best view, taken by an amateur, by any process.

For the best view in Scotland, taken by any process.

For the best group.

For the best portrait.

The Council to have the power of awarding extra medals for any picture of sufficient merit, which may not have been included in the above list.

All the pictures must be untouched, and from single negatives, except in the case of views, which may have the sky printed from another negative, or they may be toned or shaded before fixing.

As required by the laws of the society, the president, the senior vice-president (Mr. C. G. H. Kinnear), the four senior members of Council (Messrs. Scott Elliott, the Rev. Mr. Drummond, Mr. George Moir, and Mr. J. G. Tunny), the honorary secretary, and the honorary treasurer, retire upon this occasion, but are re-eligible.

The Council would suggest that the president be re-elected; that the Rev. D. T. K. Drummond be elected vice-president, in room of Mr. Kinnear; that the secretary, treasurer, and the other member of Council, be re-elected; and that Mr. Kinnear, the retiring vice-president, be added to the Council.

From the account of the honorary treasurer, it appeared that there was a balance in favour of the society amounting to £325 2s. 7d.

OFFICE BEARERS FOR THE ENSUING YEAR.

Patron.—His Royal Highness the Prince of Wales.

President.—Sir David Brewster, K.H., F.R.S., &c.

Vice Presidents.—Horatio Ross; the Rev. D. T. K. Drummond.

Council.—Alex. Young Herries, J. Ramsay L'Amy, Colonel Bell, William Walker, James G. Tunny, George Moir, Wm. Scott Elliot, C. G. H. Kinnear.

Honorary Treasurer.—H. G. Watson.

Honorary Secretary.—T. B. Johnston.

Honorary Auditor.—John Cay.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, May 25th, 1864.

At the last meeting of our Photographic Society, M. Aimé Gerard exhibited a proof which, in an historical point of view, possesses much interest. It is a portrait of M. Gosse, an eminent artist, taken by Daguerre, and has on the back the following inscription:—*A mon ami Gosse; Daguerre. Fait en six seconds, par un temps brumeaux*, 1843. Beside the historic interest this proof possesses, it claims attention from its high artistic merit.

M. Leon exhibited some glass dishes, with channelled bottoms, for which he claims the merit of avoiding the inconvenience attendant upon the use of dishes with flat bottoms, to which the plate adheres tenaciously, and which oppose a difficulty in the insertion of a hook to lift them by, resulting frequently in the tearing of the collodion film. In these grooved dishes it is easy to insert the hook, and lift the plate without risk, and the price is the same as for dishes of ordinary form.

M. Poitevin read a paper upon the application of helioplasty to ceramie decoration, in which he says:—"The engravings I obtain, upon plaster or metal, by moulding a sufficiently thick coating of bichromated gelatine, printed under a negative, and swelled by water in the non-isolated portions, have the shadow portions more or less in relief, while the lights are in intaglio. These engravings resemble ordinary lithophanie plates. I have, for some time past, turned these moulds to account, in producing slabs or curved surfaces in porcelain or parian, bearing pictures in intaglio, more or less deep, according to the intensity of the shadows in the object copied. After these plates are dried and baked in the furnace, I apply to their surface a uniform film of the coloured coating; in a second firing the design becomes palpably visible, the colour going strongly into the hollows of the engraving; but to obtain pure whites, I carefully rub the enammelled surface, until the parts in relief, which represent these whites, are denuded. I then enamel a-new all the surface with a colourless glass, with the object of glazing the whole."

The rival claims to certain photographic processes keep the photographic atmosphere in a very stormy condition. Protests and prior claims follow every announcement of a new discovery or improvement in photography, in printing ink, or in carbon. At this meeting, a letter was received from M. de Lafollye, in which he protested against the manner his process is interpreted in a certain journal. Several members remarked, in reference to this letter, that as it related to a publication entirely beyond the control of the society, it ought not to be brought before the meeting, as it would only give rise to a discussion upon a matter with which the society has nothing to do; but that M. Lafollye could, if he thought proper, communicate directly with the journal of which he complained. Thereupon, M. Poitevin made the following remarks upon M. de Lafollye's recent communication to the Society. "As M. de Lafollye has done for my two processes of photography in printing ink, upon stone and paper, which I published in 1855, I can criticise the process he has announced and claims as his own. It will be very easy, for me to prove that M. de Lafollye has not invented a new principle, and even the idea of transferring the reserve from the paper to the stone is not new, but has already been proposed and worked in the best conditions. I shall leave it entirely to the judgment of the Commission on the great prize of the Duc de Luynes, to decide upon the pretensions of M. de Lafollye. At the present time I wish only to rectify a remark in M. de Lafollye's communication, where he states, in speaking of the processes of 1855, '*as suggested by Col. James, and as done by M. Poitevin on stone.*' From this we might suppose that I had followed the suggestions of Col. James, while the fact is just the contrary, since I made, in 1855, proofs in printing ink direct upon paper before making them on stone. These proofs were admitted into the Great Exhibition of 1855, while Col. James has followed in the same direction only in 1860, five years after my publications, and when everybody was acquainted with my two processes in printing ink upon paper and upon stone."

M. Placet also put in his claim of priority to Mr. Swan's carbon printing process. It seems to us the only way to test the validity of these claims of priority is by actual results.

No one pretends to have seen such admirable results in carbon printing as those produced by Mr. Swan, and this ought to be sufficient proof to support his claim to the process by which his proofs are produced.*

A letter was read from Mr. Pouucy, at the previous meeting of the society, to which I referred at the time, but could not give textually, it is to the following effect:—

"I have the honour to send to the society a box containing some proofs, intended to compete for the Duc de Luynes' prize. It contains three large photographs, taken in printing ink of various colours, and a frame containing seven small proofs in ceramic colours; under each of these proofs is specified the colour the picture is intended to assume when burnt after it has been applied to porcelain. These several proofs are absolutely untouched, and the details of the process by which they were obtaiued will be fouud in the specification of my patent accompanying this. I call your attention to this fact, that my papers retain their sensitiveness for an indefinite period of time before and after exposure to light iu the printing fraue; they can also be kept for an indefinite time before being developed. I cau obtain my proofs in any colour, as well as with every colouring material applicable to decoration upon porcelain. I shall be very happy to operate iu presence of the Commission, if desired, and trausfer the little proofs I send you to porcelain, and print positives from any negative you may desire."

M. Robe has invented an artificial leather, which consists of collodion and gelatine submitted to particular treatment. Collodion is made into sheets by being poured upon flat glazed surfaces, and when dried is submitted to the action of sulphuric acid, so as to convert it into parchment paper, then covered with a warm solution of gelatine; this material is then tanned with a solution of tanuin, or by means of alum. This leather is very tough, and as durable as ordinary leather, only it is impervious to air. It can be prepared of all colours.

MR. SWAN'S PATENT.

Dear Sir,—Allow me to correct a misapprehension which, I observe, several of your correspondents appear to entertain respecting the nature and scope of my patent.

The mistake to which I refer, is, the supposition that the paper which I read before the Photographic Society was equivalent to a specification of my patent. The fact is, in that paper I restricted myself to a description of the particular mode of operation by which the specimens then exhibited were produced. The scope of my patent is not so restricted. It certainly includes the novelties of the process described in my paper, but at the same time it comprehends various important modifications of it, and is altogether on a much broader basis.

This will be seen when the patent is fully specified, as it will be in the course of two or three months.—I am, &c.,

Joseph W. Swan.

Newcastle, May 16th, 1864.

PHOTOGRAPHIC ENAMELLING PROCESS.

Sir,—I, by chance, last week read in the *Photographic Journal*, of April 15th, a description of Mr. Swan's carbon printing process, in which I see he patents the use of a collodion film for supporting the gelatine and carbon. I had laid aside photography for about three months, so I did not know how the photographic world had been going on. I now write to describe a process practised by me early in February last (before I laid aside photography from the pressure of business), for photographing upon china, in china colours, in which I used a collodion film, so far back, for the purpose of supporting the gelatine and bichromate while washing, and enclose you a specimen. I made a tolerably strong solution of gelatine and bichromate of potash in water, in which I ground up a small portion of china colour. I floated this on a glass plate and let it dry; when dry, I peeled it off the glass and exposed it under a negative, then I poured over the exposed side a coat of collodion, the same as I would do a glass plate, the coating of collodion was to hold it together while washing, or it would be a network of holes; when washed, I laid it upon china, and burnt it in the kiln. Before using collodion, I spread the gelatine, &c., upon paper, and printed from the back, but it took too long to print through the paper. I experimented also with nitrate of uranium, but did not get good results. Bichromate of ammonia would be better, but the example I send was done with bichromate of potash. I have experimented also with gum arabic, honey, and also albumen.

I do not like the idea of patents in photography, as it has been observed they are obstructive of progress. Photography has come to its present perfection by many minds addiug a little, and the person in patenting one little bit to make up his whole has to appropriate a good deal which others have found out, and perhaps given freely. But still experimental photography is expensive work; it takes money and it takes time, which is money, except with a person of independent means, so I scarcely wouder at Mr. Swan trying to get a patent. The system of a collection to reward any real benefit discovered, as the "Goddard Testimonial Fund," is good.

Thomas Kirkby.

Trentham, Staffordshire, May 21, 1864.

[The process used by our correspondent appears analogous to that of Fargier, and is probably similar to the secret enamelling process of Camarsac.—Ed).

ENLARGED CARBON PRINTS, &c.

Dear Sir,—I proceed to state the experimeuts alluded to in my last, of making, with success, enlarged pictures with the solar camera, by a carbon process, yielding perfect gradation of half-tones, &c., premising, as I before hinted, that the information upon which it is based is collected from various articles in the Photographic News, *British Journal*, and the French journals. I consider it just to state this, because the result and final operations are very like those of Mr. Swan's patent carbon process. It is, however, very different in many respects, for it never occurred to me, or to any of my photographic friends, to remove the tissue, and print behind a negative, as in Mr. Swan's invention, my idea being chiefly to get something less expeusive than silver printing.

Now, to proceed to business. First, wash a plate with *ox gall*; when dry, level it, and coat with the gelatine mixture as below:—

Nelson's gelatine	2 ounces.
Water	5 „
White syrup	1 ounce.
Spirit black...	1 drachm.
Saturated solution of bichromate of potass	½ ounce.

When dry, it is ready for exposure in the camera, which exposure varies from forty minutes to an hour and a quarter. After which, the plate is coated with collodion; then, when quite dry, brush over with dilute albumen, one to three of water. Then take a sheet of albumenized paper, one inch larger than the plate each way, and carefully press it in contact; dry it, and sponge the back of the paper with dilute nitric acid, one part to eight of water. When nearly dry, it will easily leave the glass plate. Now the order of things is reversed: the paper is laid upon the glass plate, with the gelatine face up, and the plate inclined, and hot water is gently poured on at its upper edge, which will speedily dissolve the unaltered gelatine, and wash away all superfluous matter, and leave a perfect carbon print, taken direct in the camera.

* M. Placet does not even profess to have produced carbon prints at all, his process is for photographic engraving, and has an incidental similarity to Mr. Swan's in one of the manipulations.—Ed. P. N.

Hanbury's Washing Machine.—G. A. asks if lac varnish will answer. It will not. It will crack and rub off as the black varnish does. If G. A. will take of Stockholm tar half a pound, and well mix it with white-lead, ground in oil to the consistence of stiff paint, and paint the wood or metal work, which must be *clean;* this dries quick, and is not acted on by acids or alkalies. Your obedient servant,

2, *St. Jude Street, May* 21, 1864. H. R. Nichols.

WASHING PRINTS AND TEST FOR HYPOSULPHITE.

Sir,—I was struck by the simplicity of a test for the ascertainment of the presence of hyposulphite of soda, given by a correspondent, in the last number of the *Journal of Photography*, who signs himself "H. G. M.", and having some prints drying, which I believed to have been washed in the most perfect manner, I determined to try the efficacy. I took four glasses of the same size:—

In No. 1. I put one ounce of distilled water, 2 minims of sulphuric, and 8 minims of permanganate of potass.

No. 2. One ounce of rather impure cistern water, with the same quantities of sulphuric acid, and permanganate of potass.

No. 3. One ounce of the cistern water, in which I placed a strip of the white sky of one of my prints, pressing it down with a glass rod, so that it should lie well under the surface. I had previously added to the water, the 2 minims of sulphuric acid, and 8 minims of the permanganate as before.

No. 4. In the same quantity of the cistern water (with the same amounts of sulphuric acid and permanganate) I placed the small piece of blotting paper (about one inch square) which had previously hung to one of the prints to receive its dripping (after the final washing), it was quite dry:—

For about half an hour very little change took place in the colour of the liquids, and I left them for about three hours; on my return, the colour of the water in the several glasses was as follows:—

In No. 1. A beautiful violet.

No. 2. Light red, about the usual colour of bricks.

No. 3. A brown yellow, muddy and dirty looking.

No. 4. Nearly transparent.

You will perceive that the piece of blotting-paper in No. 4, which had received the dripping of the *entire* sheet, acted most vigorously on the permanganate; I regret to add that the inference which the experiment has led me to draw is, that the most perfect washing of prints, unaccompanied by other means (such as the repeated use of blotting-paper, or frequent pressure between rollers, and so forth) fails to remove all the hyposulphite, with which they have been thoroughly impregnated.

Would it not be better simply to *float* the print on the hyposulphite, instead of *immersing it?* We should thus get rid of half the hypo which we so vainly seek to eliminate; nay, perhaps, *more* than half, for the softer unalbumenized side of the paper may actually imbibe more of the hypo than the front.

The more I read of the efforts made to attain a perfect system of washing, the more I am convinced that this simple fact is generally overlooked, viz., that when prints are put into water, a film is immediately formed by the attraction of the imperceptible "nap" (as it would be called in cloth) of the paper, and by the cohesion of the particles of water, so held on to the paper, among themselves. This film forms a varnish, *over* which running water, if not strongly agitated, flows without removing the hyposulphite lying below the varnish. The constant removal of this film, and the supplying fresh water to the *real surface* of the paper (*i. e.* the surface, unprotected by such a film), exposed to the free tendency of the water to combine with the hypo, is the only principle on which a safe system of cleansing prints can be constructed. It may, too, be a subject for consideration, whether the frequent addition of permanganate to the washing water may not so weaken the hyposulphite as to diminish, or remove, all its dangerous tendencies. I am absent from home and books, and can say no more on the subject, than that every time permanganate acts on hyposulphite, it deranges its chemical condition; what the result of frequent derangements may be, I am not chemist enough to predict. I write in haste, and under difficulties, but I am, sir, your obedient servant. N.

May 19th, 1864.

Talk in the Studio.

Blistering of Albumen Paper.—Carl Meinerth says, in the *American Journal of Photography*, speaking of this defect, "It occurs while the paper is *drying* after silvering. Artificial or spontaneous drying makes no difference; but not every kind of paper will blister; the one which did it (I enclose a sample) is a thin Rive's, finely albumenized, and otherwise of excellent results. It blistered when the bath was too strong or the silvering too long; one minute on a thirty-grain bath will blister it, fifteen seconds will not; one minute on a thirty-grain bath will be all right also. The final result in both cases (with fuming afterwards, of course) is the same. *Apropos*, how any one, nowadays, this side of the Styx can still prescribe an eighty-grain bath, as a *conditio sine qua non*, when one quarter as much (with common sense and care) will produce the same results, is beyond my comprehension.

Fargier's Process.—We have seen some carbon prints by Mr. Bingham, of Paris, taken by Fargier's process, which leave nothing to desire in colour, gradation of half-tone, and general excellence. The Parisian photographers seem to agree with Mr. Rogers, of St. Andrews, that this process is more easy to work than Mr. Swan's, but, that neither is sufficiently easy for commercial purposes. We cannot well understand such an opinion; as a point of simplicity, no other process appears to us to compare with Mr. Swan's, notwithstanding the manipulatory difficulties which must ever attend an entirely new process. One of the most artistic and successful of English photographers says, in a private letter just received, "We have been trying Swan's process, and succeed capitally."

After this the Deluge.—The *Birmingham Daily Gazette* informs us that:—"A new machine has just been invented for printing cartes de visite. The advantages gained by it are as follows:—It prints by means of a new process, without ink, and without pressing or drying: it requires no special knowledge or material strength; a child can work it with ease; the portraits always remain clear and distinct; and the price of the cartes is little more than that of the pasteboard, as the machine does away with the cost of workmanship. The speed with which the machine can be worked is prodigious—throwing off no fewer than 100 cartes per minute, with the clearness of lithographic impressions." Unfortunately, there is no information as to the whereabouts of this wonderful machine.

Mounting Photographs.—A correspondent, Mr. E. T. Gasson, sends the following suggestions for a method of mounting, which he states, he has found useful, the contrivances costing about sixpence. He says:—"First, go to a draper's shop, and get a roller, such as they roll calico on, a little over an inch in diameter, cut off three inches in length, bore a hole through the rollers, pass a piece of stout wire through, and turn the wire up sufficiently for the rollers to work freely. Purchase a bradawl handle at the ironmonger's for one penny, cut the small part off, bore two holes in the stout piece, which you can piece the end of the wires, which will form a good handle. Next, after you have dried the portraits, cut them to shape, place them back in a dish of water for one minute, spread them on a piece of blotting paper, then place a piece more of blotting paper over them, which will then leave them moist. Place three or four dozen, all one on the other; place them on a piece of wood, covered with a piece of wash-leather, the piece of wood to be a trifle narrower than the papers which will keep them clean. Next, a piece of board, four or five long, four wide, covered with a piece

of wash-leather, well moisten your leather on the board with gum or any other material for the purpose. Then roll your roller on your gummed leather, and gently roll the roller on the portrait, which will gum it at once very thinly and evenly. You can take it by the corner, and put it off the roller, and place it on the card: pass a piece of clean paper with your hand, which will press it close to the card. I am much pleased with the plan, and the great saving of time, which, I have no doubt, many will approve of the simple affair."

MAGNESIUM LIGHT.—The lecture at the Royal Institution, on the 6th inst., to which we referred in connection with Mr. Brothers' experiments, was by Professor Roscoe, who, conjointly with Professor Bunsen, published the first memoir on the photo-chemical properties of the magnesium light.

THE OCCASIONAL PERILS OF PHOTOGRAPHY.—*Humphrey's Journal* records a singular and fatal accident to a photographer who was taking views on Mount Look-out, Chattanooga. Having fixed his camera on the highest pinnacle his foot slipped and he was precipitated down a great distance and killed on the spot.

PHOTOGRAPHIC EXHIBITION.—The private view of the exhibition of the Photographic Society will take place to morrow, the 28th.

EXHIBITION OF SPECIMENS, &C., AT SOCIETY MEETINGS.—The Council of the Photographic Society have come to the following resolution, so as to place under proper control the tendency to make use of society meetings for advertising purposes: "That all articles whatsoever shall, before being admitted to the public meetings of the Photographic Society, be shown to the Council, in their room at the meeting, at 6.30."

ROMANCE OF A PHOTOGRAPH.—Several of the Paris journals relate the following story concerning the interpreter of the Japanese Embassy, now in Paris:—Frantz Bleckmann was a native of Holland, but being of a roving disposition, embarked on board a vessel bound for Batavia, to seek his fortune. Years passed by, and nothing being heard of him, his friends at last concluded that some accident must have befallen him, and that he was no longer living. His father had remained in Holland, but being unsuccessful in business, he came to Paris. Here his resources soon failed him, and on writing to a friend to solicit a small loan, he received the following letter in reply:—"I send you the money you ask for, and add to it the photographic portraits of the Japanese Embassy. You will remark the face of one of those strangers, for he is the very image of your son." The father could not but perceive the resemblance; the features were certainly the same, but the closely-shaven head and the Oriental costume greatly puzzled him. He, however, went to the courtyard of the hotel in which the Embassy was staying, and was so fortunate as to arrive just as the Japanese were passing to go out. The original of the portrait he at once recognized, and called out, "Is that you, Frantz?" In a moment the son—for Frantz it really was—and the old man were locked in each other's arms. The Ambassadors who witnessed the scene were greatly moved, and old Bleckmann's troubles were now at an end, as the son is wealthy and prosperous.

PECULIARITIES OF PETROLEUM BENZINE.—When petroleum is distilled at a low temperature a light limpid liquid is obtained which has received the name of benzine. It is different in its chemical properties from the benzole of distilled coal tar naphtha, and is about as volatile as an ether—its density being 0·715. It boils at a temperature between 140° and 150° Fah., and it has now become a valuable article in the arts, being used extensively as a substitute for turpentine in mixing paints, and it is also employed for the removal of grease, &c., from light kid gloves, silks and woollen fabrics. It dissolves india-rubber, asphaltum, some resins, tallow, fatty oils, paraffin, stearic acid and wax, but it is not a powerful solvent of amber, copal or shellac. Iodine dissolves in it, producing a red colour: bromine is dissolved in it with a slight explosion, and gas is disengaged which burns with a beautiful green colour. Nitric oxide gas passed into the benzine gives it a fine green colour; when lighted the flame of the gas has a broad green coat and a purple centre. Hydrogen gas passed over the surface of benzine burns with a flame emitting considerable light. The petrol-benzine cannot be mixed with water nor with wood-naphtha, but readily and to any extent with absolute alcohol, oil of turpentine, and bisulphide of carbon. In common ether it produces a turbidity, caused probably by a percentage of water. Sulphur and phosphorus dissolve only in small quantities in it.

To Correspondents.

M. A.—A negative which has not been fixed; but is varnished, is somewhat difficult to deal with. Probably the following will be the best method of intensifying it:—Make a solution of bichloride of mercury in alcohol, about ten grains to the ounce; then moisten the surface of the varnish with alcohol, and apply the bichloride solution. The effect will be that the whole surface will turn yellow, the iodide in the film being partially converted into iodide of mercury; but the shadows will be of a light primrose yellow, scarcely obstructing the actinic rays, whilst the lights will be black by transmitted light, and very non-actinic.

M. G., Amsterdam.—The maker whose No. 3 you already have, is decidedly better in our opinion.

A POSED ONE.—We fear that in all cases where colours are applied somewhat in the character of a stain or dye, there will be the tendency to unequal absorption of which you complain. We have not had much experience, however, with the liquid colours at present sold for colouring photographs. Possibly some of our readers can offer a hint as to the prevention of unequal absorption and consequent mottling.

C. W.—Mr. Wilson uses a variety of lenses, selecting such as he believes best suited for the particular subject to be taken; but he uses chiefly, we believe, the new single lens, made especially for his class of work. 2. If stopped down sufficiently, about 4 or 5 inches. It may be used for portraits, but will not give such perfect results as a lens made for the purpose. Exposure depends upon the aperture used. 3. We have seen under some circumstances 10 inches, but that is more than is intended, or can always be secured. A triple lens, with the central lens removed, is not quite so suitable for portraits as a lens made especially for the work. 4. No, decidedly not.

A CANADIAN SUBSCRIBER.—We have occasionally heard of such difficulties, but not often. We are uncertain of the cause. Write to Dr. Hill Norris himself, who will probably be able to help you. It is difficult to prescribe for the treatment of plates the preparation of which is a secret. Almost all societies print their rules; but many of them are out of print. We will endeavour to send you some.

STEREO.—We prefer that of C, made after our own design. That of D is not superior to those of A or B; the last we prefer. Write to him, and he can, perhaps, send you one of the specimens you wish. A pair of stereo double lenses will not very seriously add to the weight and bulk of your equipment. It is not necessary to have them connected with a pinion, as the focussing may be done from the back.

F. VINCENT.—It much depends on arrangement. We apprehend, however, that the landlord can demand that the stains be removed. In using a room in a dwelling-house as a dark-room, it is well to cover the floor with a piece of common oil-cloth, to prevent the boards getting stained.

PHOTOGRAPHY IN INDIA.—Mr. Warner writes to say that during the recent warm weather he *has* found the *spongio piline* of great service.

C. A. J.—Mr. Hennah's method of printing referred solely to plain paper, and would not, we apprehend, be suitable for albumenized paper.

B. T.—There is in some films a slight indication of a visible image, but it cannot be relied on as a guide in printing. It is probable that each day the sensitiveness of the film will require to be ascertained by trial, and the exposure then regulated by judgment, as in exposing negatives.

J. B.—We see no reason why you may not add nitrate of soda to an old collodion bath, if you wish to use it for printing purposes; nevertheless, the results are rarely so good as those from a printing bath without the iodide and other matter which accumulates in a bath used for collodion plates. Thank you for the paper; as you see, we have used the paragraph.

A. G.—The blistering of prints upon albumenized paper is a difficulty at times very difficult to deal with. We have found it occur chiefly with *Rive* paper, and when the toning bath or the hypo were alkaline. The best remedy we know is to use a *Saxe* paper instead of *Rive*.

IRON DEVELOPER.—We cannot tell why, if your chemicals are in the same condition, and the light the same, your exposure should be twice as long this week as last. The fogging, on applying the pyro and silver to intensify, may proceed from several causes, which you will find discussed on page 43 of our last YEAR-BOOK. You will generally find a remedy in careful washing, the use of a pure 20 grain solution of silver with the pyro solution, the use of more citric acid in the solution, and in the application of a solution of iodine to the film between the development with iron and the intensifying.

BATH.—"White streaky lines" may proceed from various causes, depending on their character. If they are in the direction of the dip, they may proceed from the bath being too strong, or from being insufficiently acid. Sometimes they will appear with a new collodion, and not with an old sample. Zigzag lines are sometimes caused by the use of a very old bath, and sometimes they arise from the collodion. 2. Filtering will not always remove greasy-looking scum from the bath. The best plan is to draw a few strips of filtering paper over the surface, whilst in the bath. This will effectually remove it. 3. The colour of your print is not bad, but the print feeble, partly from slight under-printing, and partly from the character of the negative. What colour do you wish to produce? A black or a warmer tint?

Reviews of "Le Préparateur-Photographe, by Dr. Phipson;" of "Instantaneous Dry Collodion Processes, by T. Sutton, B.A.; and of the Dr. Towler's "American Photographic Almanac," in our next.

Several correspondents in our next, and also several articles and letters standing over, in our next.

Photographs Registered during the Past Week.

MESSRS. HOOPER AND MOFFATT, 105, Market Street, Manchester.
Four Photographs of James Gaskel, Esq.

MR. CHARLES MONSON, 12, Bridge Street, Northampton.
Photograph of Rev. E. T. Prust.
Two Photographs of Rev. Thomas Arnold.
Photograph—Group—Rev. Thos. Arnold and Four Gentlemen.

MR. H. THOMSON, 30, George Street, Perth,*
Photograph of Rev. John Anderson, A.M.

* ERRATUM—In our last we gave this gentleman's address as "Bath," instead of "Perth."

THE PHOTOGRAPHIC NEWS.

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THE PHOTOGRAPHIC EXHIBITION.

THE tenth exhibition of photographs, in connection with the Photographic Society of London, was opened for private view on Saturday last, and is now open to the public. Although there is no lack of good photographs, we fear that the first impression with many visitors will be one of disappointment. The room in which it is held—the Gallery of Female Artists, 48, Pall Mall—is very small, and gives an air of insignificance to the exhibition. The exclusion of coloured works, necessary in space so limited, removes one of the sources of variety and of interest; and some other causes tend towards producing on the mind of the general visitor a sense of monotony. Nevertheless, the exhibition is in many respects a good one; and the hanging committee have executed their delicate task with great judgment and fairness. Notwithstanding the limitation of the exhibition to the works of members of the society, a large number of contributions remain, we understand, unhung, not from want of merit, but from absolute want of space; and the committee felt it better not to hang meritorious works at all, than to "sky" them, or give them a position absolutely beyond the range of sight.

In addition to the want of variety, from the causes we have named, there is another lack of variety, very singular, and arising from causes difficult to determine. There is absolutely but one single print from a dry-plate negative exhibited. Out of two hundred and sixty-seven frames exhibited, there are, so far as the catalogue informs us, but one picture that is not produced by the wet collodion process. The Rev. T. M. Raven contributes a few pictures, which are described as "wax-paper and collodion," from which we infer that each print, having sky and clouds, is from two negatives. It is a somewhat singular circumstance, that with all the interest which has been manifested in the improvement of dry processes, and with the unquestionable progress made in the tannin process, that but one dry-plate result is exhibited, and that from a plate by one of the oldest processes—the collodio-albumen. It is possible that this is partly due to the fact that, in a limited exhibition, in which only the best specimens can find a place, the productions of the wet process have obtained a preference; and is probably due in a still greater degree to the limitation of the exhibition to members of the society, and those admitted as exhibitors by payment, by which the contributions of many amateurs and others, able dry-plate photographers, not members of the society, are necessarily excluded. We especially miss the Manchester men, representatives of the collodio-albumen process, Mr. Mudd, Mr. Sidebotham, Mr. Wardley, Mr. Petchler, Mr. Mann; we miss also Maxwell Lyte, with the metagelatine process, and Mr. Bourne, with the Fothergill process, and many other excellent dry-plate men, whose works we have seen at all or some of the former exhibitions.

Amongst the masters of wet collodion we miss many whose works have graced the exhibition in former years. We see nothing from Mr. England, nothing from Mr. Silvy, nothing from Mr. Mayall, nothing from Mr. Vernon Heath, nothing from Mr. Dixon Piper, nothing from Mr. Wilson, nothing from Mr. Blanchard, nearly nothing from Colonel Stuart Wortley, nothing from Mr. Rejlander, nothing from a host of other good men, whose names do not at this moment occur to us. We have, on the other hand, fine contributions from some young photographers, who will make their mark. Lady Hawarden maintains in her second year's contributions all the art promise of the first, as does also Mr. H. Cooper, jun. Mr. Frank M. Good sends, in his first year, some charming pictures; Mr. Macfarlane, in his first year's contributions, sends the finest photographs of Indian scenery we have ever seen; Mr. Gillis, a gentleman who has exhibited before, now, for the first time, makes his decided mark, by the contribution of some of the very finest pictures in the exhibition; Mr. Debenham's first year's contributions take high rank in portraiture; Mr. Hubbard—not a familiar name—sends some studies with many fine qualities; and other new men promise to fill the blanks which would otherwise be created by the absence of the masters we have mentioned.

Whilst there are some pre-eminently good pictures, the exhibition is characterized on the whole by great evenness of excellence, and there are very few absolutely bad ones; these being rather defective in art than in photography. Clean, careful photography prevails, there are no blurred, patchy pictures, very few hard black-and-white pictures without half-tone, very few white skies; the portraiture and landscapes are alike generally respectable. There are, we regret to state, no reproductions worth mention, nor, with the exception of photolithography and Mr. Swan's pictures, any specimens of novelty of any kind. Mr. Swan is very inadequately represented. With the exception of two prints of the same landscape negative, one reversed and one non-reversed, he exhibits nothing. Those exquisite portraits which have been the admiration of all who have seen them, and the wondrously delicate prints from Wilson's instantaneous stereo negatives are not exhibited. Photolithography is exceedingly well represented. Mr. Osborne, Colonel James, and Mr. Toovey each exhibited specimen of very great excellence, indeed, indicating great progress in this important branch of the art. Mr. Dallas also exhibits some good photo-electric engravings, the majority of which we have, however, seen before.

In portraiture, Mr. T. R. Williams maintains his unquestionable pre-eminence. He exhibits three frames, one of large vignette heads, one of small vignette heads, and one of full-length card portraits: the two latter are without his name, from some oversight in preparing the first edition of the catalogue; but there is little danger of mistake to those who are familiar with his work; they could not belong to

any one else. It is very difficult to state the cause of the pre-eminence of these pictures as it depends on a variety of subtle causes. Other pictures are delicate, are vigorous, are well modelled, are easy and artistic, are well printed; but these pictures possess these qualities collectively in a degree rarely attained in others singly. The absence of constraint in position, the ease and naturalness of expression, the fleshy texture, the relief and modelling, and the delicacy in definition, the warm tone and richness of the printing are all very admirable, and there is in each frame at least one specimen which might be selected as a type of perfection in photographic portraiture.

M. Claudet exhibits chiefly card pictures, and these are distinguished in a most admirable degree, by gracefulness of position and arrangement, and delicacy of photography. M. Joubert's portraits, erroneously described in the catalogue as by the "phototype" process, are very perfect: at once delicate, round, bold, and artistic, they command many admirers. Hennah and Kent send some good specimens, but all on albumenized paper: the plain paper proofs, once their speciality, appear to be abandoned. Mr. H. P. Robinson sends some grand specimens of portraiture large in size, and of which the photography and the art are alike admired; we miss with regret, examples of his charming card portraits. Mr. W. E. Debenham, as we have said, sends some very fine specimens of portraiture which are at once delicate and forcible, and which, with a little more artistic feeling, would be very perfect. Maull and Polyblank send some good whole-plate pictures: they also, unfortunately send some whole sheet portraits, coarse and vulgar. The manipulation was doubtless difficult; we wish it had been impossible. Lucas Brothers send some good portraits, exhibiting fine feeling. The Earl of Caithness sends a portrait of the Prince of Wales, poor in photography, and worse in art. Messrs. Ross and Thompson send a variety of portraits, especially of children, possessing so much of artistic feeling and skill in arrangement, that we regret much the tendency to blackness and heaviness they all possess. A lady, Julia Margaret Cameron, sends some rather extraordinary specimens of portraiture, very daring in style, and treading on the debateable ground which may lead to grand results or issue in complete failure. We must refer to these as well as to other portraits more in detail at a future time.

There are some very fine compositions and studies. Lady Hawarden contributes some very charming examples. Mr. H. P. Robinson sends his "Autumn," "Somebody Coming," and a grand portrait study. Mr. Cooper and Mr. Hubbard have both some very fine studies, as have also Messrs. Ross and Thompson. M. Claudet exhibits some studies of hands, arms, eyes, mouths, &c., which are admirably done, and very valuable to the painter. Mr. Currie has some very clever little compositions. There are a few other studies, but not of importance.

The landscape contributions are numerous and very fine, and comprise so many first-class works that the award of a prize for the chief excellence will be a difficult task. Mr. Bedford fully maintains his reputation, and exhibits some most charming pictures. Mr. H. P. Robinson exhibits some landscapes which are equal to his portraits and compositions, and we cannot use higher praise to any pictures. Major Gresley has some landscapes and figures far surpassing anything we have before seen from him. Mr. Gillis sends some wondrously fine pictures of difficult subjects. Mr. Annan sends some of the most beautiful landscapes in the exhibition. Some of Mr. Frank Good's pictures leave nothing to desire. The Hon. Warren Vernon, the Earl of Caithness, Col. Verschoyle, Mr. Spode, Mr. Cole, Mr. Macfarlane, Mr. S. Thompson, Mr. P. Parsons, and some others, have landscapes of which we shall have to speak more fully. The stereoscopic contributions are not numerous, the most noticeable being those of Mr. C. A. D. Halford, which contain many fine pictures. There are not many architectural subjects to compete for the prize, and these of not more than average excellence, nothing in size, subject, or grandeur equal to some of the continental pictures of former years being exhibited here. Mr. Bedford has a few of those unsurpassed interiors with which photographers are familiar in his works, and these appear to be the most noticeable architectural pictures contributed.

There are no transparencies of any kind, nor enamels, nor applications of photography to decorative and ornamental purposes. The contributions generally are such as belong to photography in its most obvious and most restricted sense, but these are, in the main, very excellent; and whilst the exhibition, at the first glance, lacks variety and interest, it is found to be worthy of prolonged and careful examination for the full realization of the minute and varied beauties of a large number of the individual contributions. In our next we shall give more detailed notice of some of the pictures.

Critical Notices.

INSTANTANEOUS DRY COLLODION PROCESSES.

By Thomas Sutton, B.A. London: Samson Low, Son & Marston.

Amongst the anomalies which arise to puzzle the photographer with an ever-recurring persistency, none is more perplexing than the fact so common, that processes described as simple, certain, and successful in the hands of one operator, turn out in the hands of another, who appears careful to observe all the conditions, utter and disgusting failures. With dry processes, especially those described as extra rapid, this has been pre-eminently the case. The use of hot development for tannin plates, promised at one time to solve the question of instantaneous dry plate photography. We have seen some most excellent pictures, with very rapid exposures, produced by the aid of heat; but in the hands of a majority of operators, fog, torn films, and general failure have followed its use. The use of gum, glycerine, honey, malt, &c., with the tannin solution, whilst giving increase of sensitiveness, has generally decreased certainty. The use of bromized collodion without iodide, and the use of alkaline development have been attended with similar results: there have been many successes; but some failures, just sufficient to render the operations uncertain.

Mr. Sutton's object in the present pamphlet is, to describe minutely some methods of preparing dry plates, which he believes, if carefully followed, will give very great sensitiveness and absolute certainty of result. We may add that some of the negatives taken by Mr. Sutton to illustrate the process which we have seen, fully bear out his statements. There are two or three processes described in the pamphlet; but the chief importance is given to a modification of the tannin process, and of the methods of development with carbonate of soda, ammonia &c., already described in our pages, on their introduction by Mr. Leahy and Major Russell. Mr. Sutton does not claim the introduction of the materials used, so much as the specific arrangement, and combination of formula and operation upon which success depends. We propose here to give a brief abstract of the principle method described, referring our readers to the work itself for fuller detail.

After careful instructions for the cleaning of the plate, and a recommendation of a preliminary coating of india-rubber, dissolved in benzole to secure certainty of adhesion in the film, he proceeds to a consideration of

The Collodion.—The composition of the collodion is a matter of vital importance in this process; much more so than the state of the bath, or the other chemicals. For instance, I have on a shelf in my laboratory three bottles containing different kinds of collodion. The first is that which I recommend as the best, it is bromo-iodized, quite colourless, and made with purified methylic solvents. The second is made in exactly the same way, but with pure solvents, it is rather old, and has a slight tinge of yellow colour. The third is old red potassium-iodized collodion, made about six months ago, with a common sample of ether. On comparing these three kinds of collodion, treated in the same way, the rela-

tive time of exposure required is as two to three to a hundred; in fact, the red samplo of collodion will not give a decent picture at all, with any bath, old or new, acid or neutral. The first two samples give equally good pictures, but the first is much more sensitive than the other, owing chiefly to the means used for purifying the ether and alcohol with which it is made, and partly, perhaps, to a peculiarity which methylic ether possesses of re-absorbing freo iodine which has once been liberated in it.

Such experiments as the above, oft repeated and greatly varied, leave no doubt as to the best collodion to employ for this purpose, and the following is the formula by which it is made:—

Plain Collodion.—

Pyroxyline	6 grains
Ether, sp. gr. ·725	5 drachms
Alcohol, sp. gr. ·805	3 ,,

Bromo-iodizing Solution.—

Iodide of cadmium	16 grains
Bromide of cadmium	6 ,,
Alcohol, sp. gr. ·810	1 ounce.

Add one part, by measure, of the iodizing solution to three parts, by measure, of the plain collodion. Shake it well up and leave it undisturbed for a few hours; then draw off the top carefully with a syphon, or pass it through a collodion filter, and it is ready for use. This collodion is quite colourless, and if kept in a cool place it will retain its good qualities for a considerable time.

The pyroxyline should be made according to the formula given in my treatise on the "Collodion Processes, Wet and Dry."* It should dissolve entirely, without any sediment, and yield a clear solution which might be used at once without standing to settle; although it is a wise precaution to treat it in the manner described in order to remove foreign particles. No trace of acidity should contaminate the pyroxyline, and it is a good plan to add a pinch of soda to the water in which it is washed, as described in the treatise referred to.

The ether and alcohol should be methylic, but redistilled with lime and charcoal, so as to neutralize all acidity and remove traces of fusel oil and other impurities. Methylated solvents treated in this way yield a more sensitive collodion than pure solvents, however highly rectified; but, on the other hand, collodion made with common methylated solvents, which have not been highly purified, is to be scrupulously avoided, for success in this process is impossible with such collodion; although it may be found possible to take negatives with it in the ordinary way, by using a strong iron developer.

Bad collodion is to be avoided, as frequently containing fusel oil, oxalic acid, iodic acid, &c. The use of the bromides is insisted on, as preserving the sensitiveness of the collodion. On the age of the collodion he makes the following remarks:—

The most sensitive films are obtained with a new and colourless collodion, made with fresh distilled ether and alcohol. Old collodion is not so sensitive as new; and if it has acquired a deep colour it will be found extremely slow in this process, although it may answer well enough for positives, or thin negatives developed with iron. The more you can avoid those causes which tend to produce changes in the ether, with the liberation of iodine in the collodion, the more sensitive the film will be in this process; and the fact is curious because it is found that the addition of nitric acid to the nitrate bath does *not* diminish the sensitiveness of the film, even when added in the proportion of three minims to the ounce of bath solution. The use of a suitable collodion is, therefore, one of the chief points to be observed in this process. It is the main secret of success. The rest is very little beyond mere manipulation.

The Nitrate Bath.—In speaking of the nitrate bath, Mr. Sutton points out a common cause of failure to which we can give full corroboration. We refer to the employment of an old bath, charged with the various products accumulated in the course of use. He recommends the use of either acetic or nitric acid, as may be convenient, remarking that the latter does not produce insensitiveness, as might have been anticipated. The general impression, based upon both theory and practice, has been that the organic acid was decidedly preferable in a bath for dry plates; but the recent experience of many able photographers in the tannin process seems to indicate that nitric acid may be used with impunity, especially if gelatine be avoided as the preliminary coating. As the stability of a bath is decidedly better preserved when it contains nitric acid than when acetic acid is present, the use of the former is preferable. Mr. Sutton's remarks on the subject are as follows:—

* For the benefit of those of our readers who do not possess Mr. Sutton's treatise, we may remark that the formula in our Year Book is very similar. —Ed. P.N.

The plate must now be immersed in a solution of nitrate of silver, strength about 30 grains to the ounce of distilled water. The nitrate of silver should be of the purest kind, and trebly re-crystallized. That which is prepared for the negative collodion processes, and put up in hermetically sealed glass tubes, is the right sort, and no other should on any account be used. The solution thus made is not in the slightest degree acid to test paper, but it should be slightly acidified either with acetic or nitric acid—it does not much matter which, but perhaps acetic is the safest. I have always been in the habit of adding one minim of glacial acetic acid to four ounces of bath solution, and this has answered perfectly; but lately I have tried nitric acid instead, and that seems to answer just as well, and does not reduce the sensitiveness of the film as one might expect. The solution should always be filtered before use, in order to remove undissolved particles which produce black comets in the negative; and it is a good plan to leave a coated plate in it, in order to satisfy its first avidity for iodide of silver.

The nitrate bath always works best when fresh made; and an old bath, saturated with double salts of silver and organic matter, is very liable to give veiled negatives. As soon as this happens, the best plan is to make a new bath, and throw down the silver in the old one with salt, and add the chloride to the silver residues. You cannot cure the vagaries of an old worn-out bath, and the mere addition of silver to bring it up to the right strength does not always make it work well. For home use, it should always be kept in a glass vessel, or if gutta-percha is used for a bath when travelling it should be made of the very best material. Baths manufactured by the Gutta-Percha Company do not seem to injure the nitrate of silver solution, but there are impure kinds of gutta-percha used for this purpose by other makers, which have been found to put the nitrate bath out of order very quickly.

The plate is then thoroughly washed, and coated with a 15-grain solution of tannin. The office of this solution is not, Mr. Sutton believes, that of a preservative, but in order to increase the density of the lights and the clearness of the shadows. He says:—"The proof that it has no effect in increasing the sensitiveness of the film is, that if you omit the tannin, and expose and develop the simply washed plate, you get the same amount of detail with the same exposure, but the lights are not so pure and the blacks more difficult to intensify. The plate is, in fact, rather more sensitive without the tannin than with it, but it does not yield satisfactory negatives in that state."

Mr. Sutton does not find any difference, whether the plates be dried spontaneously or by artificial heat; but it is important that it be effected at a uniform temperature, or uneven patches on the plate will be the result.

Exposure.—On the subject of exposure, and the latitude permissible, Mr. Sutton makes some interesting remarks, and also on the stop to be used, as it appears that if a small stop be used in a bad light, a veiled, feeble negative is certain to result. Mr. Sutton says:—

There is considerable latitude allowable in this process in the time of exposure. Thus, you may either give the same exposure as to a good wet collodion plate in its most sensitive condition and to be developed in the ordinary way with an acid iron solution, or you may give six times as long and still save your negative; the difference being, that in the former case you continue longer the action of the alkaline developer than in the latter case. This power of modifying the development, so as to suit the exposure, is a very important feature of the process, and one which has been long desired and sought after in a process for views, because nothing is so mortifying as to find on developing a dry plate on your return home that it is spoilt through an error in the time of exposure.

But although a magnificent negative can be got by this process, fully developed in the dark shadows and loaded with fine detail in every part, with an exposure not longer than that which a good wet collodion plate would require under the same circumstances, yet it is a good plan to be on the safe side, by exceeding that exposure a little whenever circumstances permit of it, because there is then less pushing required in the development, and less risk of veil or fog over the plate from using a strong alkaline solution. The chemicals will do the work perfectly well if need be, but it is better to make light do the work if you can, particularly if a soft, harmonious negative is required.

There is also another point worthy of notice in this process, viz., that the size of the diaphragm should always be proportional to the intensity of the light in the image, because you cannot satisfactorily make up for want of light by a corresponding increase in the time of exposure. When the light is bad use a large stop, and conversely. When the object is very dark, the stop very small, and the exposure very long, the negative is liable to be much veiled; and not only so, but a curious halo or light edging is seen in the

negative round the edges of the dense portions, which gives a disagreeable hardness to the outlines in the print; and at the same time those portions in which the details are imperfectly brought out are the most veiled. But the veil does not extend beyond the boundary of the under-exposed part of the picture; it stops short at the edge, and produces a very queer patch, the appearance of which cannot be easily described. Whenever, for optical reasons, it is necessary to use the smallest stop to the lens, upon a badly-lighted subject, a wet collodion plate would give a better result than could be got by this process. Moreover, this peculiarity is most observable when the nitrate bath is old; with a new bath it is hardly perceived at all.

On the other hand, excessive over-exposure produces an evil which has been called blurring, and which consists in the most strongly-lighted and densest parts of the negative spreading beyond their boundary over the other portions. But this occurs under the same circumstances in wet collodion plates, and the cause is optical and not chemical. Blurring proceeds from reflexion of the oblique pencils of light at the inner surface of the glass plate, and it is always most strongly marked where the pencils are incident upon the plate at angles of the greatest obliquity. The evil is entirely avoided by exposing the plate with its back instead of its film to the lens, and this at once proves the cause to be optical and not chemical. In a dark slide which I am in the habit of using for stereoscopic pictures, the plate rests with a quarter of an inch in width at each end shaded by wood, so that no light from the lens can fall upon it. Now, in all over-exposed pictures, whether by dry or wet collodion, taken in this slide, the band of sky extends beyond the boundary of the picture over the shaded ends of the plate, the effect being produced by internal reflexion of the most oblique rays at the back of the glass plate. Blurring is also produced sometimes by a lens which is dirty, and therefore diffuses the light. Whenever blurring occurs from the first-named cause alone it is a proof of over-exposure of the brightest parts of the picture. Flat plates, which include a very wide field are particularly subject to this fault near their margin. It is always a good plan, in taking a view, to shade the sky whilst the foreground is receiving a longer exposure. If this sort of thing is not done, subjects which combine much strong light and deep shadow offer great difficulties, unless the plate is reversed in the slide.

Instantaneous views of breaking waves are very easily taken by this process, with a portrait lens either with full aperture or one of the larger diaphragms. When the light is good they may also be taken by a single view lens, 5 inches focus and ½-inch stop. Street scenes, with moving figures, require the collodion to be new, and in its best state. Whatever, in fact, can be taken upon a wet collodion plate, bromo-iodized and developed with iron in the usual way, can be taken with the same exposure upon these dry plates.

Development.—The development of a dry plate is always a delicate operation requiring care, patience, and judgment; in this process where an alkaline developer is used, the greatest possible care is necessary. In our own hands carbonate of ammonia as the alkaline agent has given good results; Major Russell also recommends it, and we have seen Mr. England manipulate with the same salt, with the utmost certainty and success; Mr. Sutton believes, however, and has found in his own practice that bichromate of soda is more certain and satisfactory. The student is warned that the appearances of a good negative by this process, is altogether different to that of a negative by the wet process, having by reflected light a veiled flat appearance, like that of a waxed-paper negative; it is important therefore that they be judged always and only by reflected light. Of the mode of development, he makes the following remarks: —

There are two distinct operations in the development of the negative; the first, which may be called development proper, and in which the picture is brought out feebly in all its details and rendered visible; and the second, in which the feeble details are intensified sufficiently to stop the light in printing. These two stages of the development are in this process analogous to the two corresponding stages in the common operation of developing a wet collodion plate, in which a feeble image is first brought out by means of an acid solution of protosulphate of iron, and afterwards intensified by an acid solution of pyrogallo-nitrate of silver; the only difference being, that in this process an *alkaline* solution of pyrogallic acid is used for the development proper instead of an *acid* solution of protosulphate of iron mixed with the free nitrate of silver which clings to the film.

Should it be found on developing the first of a batch of plates that they have all been greatly over-exposed, the best way will be to develop the remainder with the usual acid pyrogallo-nitrate of silver, and not employ alkaline development at all; or, at any rate, use ammonia instead of soda, and that very sparingly.

For the development of the latent image by the alkaline method, make two solutions according to the following proportions; one being a solution of bicarbonate of soda in water, strength 10 grains to the ounce; and the other a solution of pyrogallic acid in absolute alcohol, strength also 10 grains to the ounce. The soda solution should be filtered through a tuft of cotton wool inserted in the neck of a funnel.

As soon as you are ready to develop the picture, put into a measure an ounce of water, and one drachm, at most, of the soda solution. Then pour water all over the film, so as to wet it equally, and at the same time wash off the tannin; and hold it horizontally while you add to the contents of the measure 20 mins. of the alcoholic solution of pyrogallic acid. This mixture immediately takes a pale brown tint; and it should be well stirred up with a glass rod, or shaken, so as to blend the contents thoroughly together. Now, without delay, pour it quickly and copiously all over the film, and keep it flowing backwards and forwards, and to all the edges and corners, whilst you watch the development of the picture. In a few seconds, if the plate has been fully exposed, the sky and highest lights will faintly appear, and in the course of two or three minutes more, the darker details of the shadows will appear also; but the negative in this state is very thin, and it is impossible to intensify it by this developer, however long you keep it upon the plate. If you wish for a picture exhibiting boldness of contrast between the lights and shades you must stop the development rather soon; but if you wish for a very soft and harmonious picture, with fullness of detail, you must push the development as far as you can, remembering that the longer the alkaline solution remains upon the plate the stronger will ultimately be the dark details of the shadows. There does not seem to be much risk of altogether destroying the negative, however long the alkaline developer may remain upon it, so that it is safer to leave it on too long than too short a time, particularly if the exposure has been very short; but if the plate has been fully exposed, and the development is pushed to an extreme, it may be difficult to intensify the dark parts of the negative sufficiently to stop the light in printing without intensifying too much at the same time the details of the shadows, and for this reason a fully-exposed and over-developed negative will yield a flat pale print. Great judgment is required in the development, and the rule is to push the development if the plate appears under-exposed, and to stop soon if the details come out quickly. Great latitude is allowable in the exposure if you develop accordingly; but judgment and tact are necessary in the development, and it is, of all the operations, the most critical. The negative is now very pale and thin, and you cannot, without some experience, form an idea of what it will be when intensified in the next operation; neither can any exact rules be laid down in so many words for your guidance in developing.

There is one great advantage in the alkaline development over every other, viz., that the solution does not produce irregularities and stains, or lines upon the film. It is very weak, and may be copiously applied, without fear, to every part of the film. The development also proceeds in such a way that the highest lights which are first brought out do not suffer by the prolonged action of the solution, whilst the feeble details of the shadows are being developed. In this invaluable property the alkaline developer stands alone, and satisfies a condition which has long been sought for by photographers.

As soon as the picture is sufficiently developed, it must be well and thoroughly washed with water, in order to remove the traces of the alkaline solution which cling to the film. Unless the plate is now well washed the picture will be fogged and stained the instant the intensifying solution touches it.

The alkaline developer is extremely unstable, and the ingredients should not be mixed in the measure until you are ready to use them. The alcohol in which the pyrogallic acid is dissolved should be absolute, because if it contains water the solution quickly turns brown and loses its energy.

It is safer to use a carbonated than a caustic alkali in the developer. If caustic potass be used it is liable to produce a black stain where it first touches the plate. Ammonia is a solvent of oxide of silver, and also of bromide of silver; it should not, therefore, be used either in the liquid form or in that of carbonate, because it renders a longer exposure necessary, by obliterating the finer details of the shadows before they can be developed. If ammonia is dropped upon any part of an exposed plate, it instantly destroys all trace of the action of light. Carbonate of soda appears to be the best alkali to employ; but if ammonia is used instead, a single drop to the ounce of water will be enough, and the plate must then receive double or treble the exposure which would be sufficient for the soda developer.

The negative is then to be intensified as follows:—

Into one bottle (glass stoppered) put a solution consisting of

Distilled water	1 ounce
Pyrogallic acid	2 grains
Glacial acetic acid	2 scruples.

Into another bottle (also glass stoppered) put a filtered solution of aceto-nitrate of silver, consisting of

Distilled water	...	...	...	1 ounce
Nitrate of silver	...	...	...	20 grains
Glacial acetic acid	...	...	...	20 minims.

The negative should be intensified as soon as it is developed, and the operation not deferred. The plate having been thoroughly washed from the alkaline developer, pour over it first some of the acid pyrogallic solution (without silver), in order to destroy entirely any remaining trace of alkalinity in the film; let this run off into the sink, and then mix in the same measure the intensifying solution by adding to one ounce of the pyrogallic solution twenty minims of the aceto-nitrate of silver. Shake this well up in the measure, and pour it quickly over the plate, which should now be held horizontally upon a suitable holder, so as to prevent blackening the fingers. Let the intensifier flow steadily backwards and forwards over the whole of the plate, but particularly to all the corners and edges, because the centre is sure to take care of itself. By degrees, but not very rapidly, the blacks now become denser, and a thin veil spreads over the plate which hides the vigorous black of the shadows of the picture when viewed as a positive against the black background of the developing tray or sink. But this thin veil need not alarm you, for it is not fog, and if you hold up the negative before the window and look *through* it, instead of *at* it, you find the lights quite clear and transparent. Proceed in this way until sufficient density is obtained, and by that time you will probably find that all trace of the picture by reflected light is lost. But the lights are still clear and transparent when looked *through*; and the blacks dense enough to stop strong sunshine for a time; while between these clear lights and dense blacks there is found every gradation of tone, and no part wanting in detail.

I must caution the reader against adding silver from the nitrate bath, or from a printing bath, to his intensifying solution, instead of fresh silver, as that will be likely to produce a curious kind of fog of a greenish colour upon the negative, owing to the presence of a double salt of silver, which acts in an unexplained way. Also, if the film has been excited in a very old or disordered bath the intensifier is liable to fog the plate, for the same reason. The double salts of silver, obtained by the action of a solution of nitrate upon the iodide, bromide, or chloride, produce some curious effects in photography which are at present imperfectly understood.

The negative is then to be washed carefully, and fixed in a saturated solution of hyposulphite of soda, washed and varnished.

After describing the operations in detail, a most valuable chapter follows, which should be read by all dry-plate photographers, on the causes of failure. These are most minutely and intelligently considered, and many of the opinions given we can verify from personal experience. This is followed by a chapter describing an equipment of apparatus, which the author has found most convenient for dry-plate operations. Modifications of the rapid tannin dry process, the tannin wet process, the Bartholomew-Hannaford modification of the Fothergill process, and the gum process follow, thus comprising all the dry processes now chiefly employed. In reference to the process of which we have given a synopsis here, the author says:—

> As a proof of the instantaneity of my plates, I have also sent to England, for exhibition, a negative upon a dry plate, prepared by me in the manner now described, one half of which represents breaking waves, and the other half a country lane some miles distant from the sea, and taken on a different day, a feat which could not be accomplished with a wet collodion plate, and one which ought to satisfy the most sceptical.

THE AMERICAN PHOTOGRAPHIC ALMANAC FOR 1864. Edited by John Towler, M.D. New York: J. W. Ladd; and Liverpool: John Atkinson.

The American Photographic Almanac is issued as a supplement to *Humphrey's Journal*, and is edited by the gentleman who conducts that journal. Like our own almanac, it is not simply an almanac, but contains in a condensed form for ready application a complete compendium of photographic information of all kinds. It is one of the most comprehensive books of photographic recipes we know, carefully compiled, and intelligently and pleasantly stated. It is more ambitious than similar works on this side of the Atlantic, is handsomely bound in magenta cloth, and sells for a dollar.

LE PREPARATEUR PHOTOGRAPHE, ou Traite de Chimie a l'Usage des Photographes, &c. Par Le Dr. T. L. Phipson. Paris: Leiber.

Dr. Phipson has in the volume before us furnished French photographers, and English photographers who read the French language, with a very useful manual of photographic chemistry, a task for which his long connection with the photographic press, and his recognised ability as a chemist have well fitted him. His aim has been, as stated in the preface, first, to give the photographer an exact idea of the nature of the different bodies with which he is employed in his daily manipulations; secondly, to furnish to those occupied in the manufacture of photographic chemicals, the best and newest methods in use; thirdly, to enable the purchaser of photographic chemicals to assure himself of their purity; and, lastly, to place in the hands of beginners a concise elementary treatise on chemistry, which will prepare them to profit by the study of more advanced works. The intention of the work is well fulfilled, and the result is a valuable compendium of photographic chemistry well fitted to the wants of operators.

Scientific Gossip.

The Constitution of the Sun—Radiation of Heat from Incandescent Sodium Vapour—Theoretical Considerations on the Heat Rays—A New Thermospectrometer.

Some experiments recently published, by Professor Magnus, corroborate, in a striking manner, Kirchhoff's theory of the constitution of the sun. The ordinary hypothesis which was, we believe, first put forward by Herschel, in 1795, is, that the sun consists of a dark nucleus, surrounded with a photosphere, or atmosphere, giving out light and heat. Between the latter and the nucleus, he assumed the existence of a light-reflecting atmosphere, which, in virtue of this property of reflecting, hindered the illumination of the nucleus by the photosphere. This photosphere Herschel concluded was neither a liquid nor an elastic fluid, but consisted of luminous clouds. The phenomena of the solar spots were accounted for on this theory, in a manner which, if not quite satisfactory, was at least reasonable enough to be adopted by most scientific men, up to within the last few years. Since the spectrum discoveries of Bunsen and Kirchhoff, attention has been again drawn to this subject, and the latter physician has been led to the supposition that the sun is composed of a solid or liquid nucleus, which is at the highest temperature of ignition, and is surrounded by a transparent atmosphere of somewhat lower temperature. He says that the old hypothesis is so completely in opposition to the higher physical principles, that we must abandon it, even if we are not in a position to offer any other explanation, which should render the spots on the sun at all intelligible, for it is difficult, if not impossible, to suppose, according to our present knowledge of the radiation of light and heat, that the photosphere which sends out the heat of the sun should not have the nucleus which it incloses, heated to ignition, as Professor Magnus remarks, the reflecting atmosphere assumed, to exist between it and the nucleus, may indeed hinder the illumination of the latter, but not its becoming gradually heated.

With the exception of Secchi who has observed the smallest quantity of heat which is radiated from the poles, than from the equator of the sun, no one up to the present time has drawn any conclusion of the constitution of the sun from the heat which it gives out. The experiments of Magnus on this subject give a new insight into the constitution of this heavenly body. If we observe the heat radiating from a non-luminous gas flame, by means of a thermo-electric pile, and galvanometer, and then introduce some soda into the flame, Professor Magnus finds that, not only does it become intensely luminous, but the radiation of heat will also increase. In the experiment the thermo-electric pile was so arranged, that a

fixed spot in the soda flame was always compared with the same spot in the non-luminous flame; and moreover, the platinum wire which held the bead of ignited soda was placed too low down in the flame for any direct heat to radiate from it against the thermo-electric pile. Although obviously a part of the heat of the flame was taken up in heating to redness the soda and the platinum wire, which carried the soda, and in converting the soda into vapour, although, therefore, the flame had altogether a lower temperature than it had when it was non-luminous, yet nevertheless it radiated about a third more heat than before. If, instead of soda vapour, a piece of platinum was brought into that part of the flame experimented upon, a still greater radiation of heat would occur, and when this platinum plate was covered with carbonate of soda, the radiation of heat increased afresh, so as to become half as much greater as before, when the plate without sodium was used, and it rose still higher when, in addition to platinum covered with soda, the whole of the flame was filled with soda vapour, by means of a platinum loop containing soda placed low down in the flame. In this manner it was found that there was nearly three times as much heat radiated as in the case of the non-luminous flame.

Professor Magnus concludes that these experiments show that gaseous bodies radiate very much less heat than solids and liquids. It can, therefore, hardly be maintained that a gaseous or vaporous photosphere is the seat of the solar heat. The experiments show another remarkable fact, that ignited soda has much more radiating power than platinum heated to an equal temperature.

We think that another important deduction which has escaped Professor Magnus may be drawn from these experiments. When soda is brought into a flame, and the emergent light examined in the spectroscope, it is seen to be of one degree of refrangibility only. Over the whole range of the visible spectrum, from the lowest red to the extreme violet, only one spot vibrates in synchrony with the heated soda atoms. But heat is likewise given off by the soda flame in very large quantities, and the heat rays are just as much a portion of the spectrum as the visible or the actinic rays. If, therefore, we had some means of observing the thermic spectrum, we should find that the sodium spectrum was far from simple. Optically, sodium stands next to thallium in the simplicity of its spectrum; at ordinary flame temperatures, thallium radiates one, whilst sodium radiates two homogeneous rays—these latter so close together, as to appear but one in ordinary instruments. Other metals give more complicated visible spectra; the activity imparted to them by the high temperature is expended over a wide extent of the coloured spectrum, whilst with sodium and thallium, the energy is concentrated into one line; hence the wonderful luminosity of these homogeneous lights, and the excessive brilliancy which they exhibit in comparison with other coloured flames given by different metals. Sodium, however, spends some of its vibrative energy in the invisible heat spectrum, and it would be a matter of considerable interest to examine whether the other metals, such as lithium and thallium, which give simple optical spectra, also radiate heat rays. This has indeed been found to be the case with lithium, which is stated by Professor Magnus to act like sodium, and it is probable that thallium would act in a similar manner; but from these theoretical considerations we should not expect to find that metals which yielded complicated optical spectra, such as barium or copper, would also emit heat rays of great intensity. Physicians now require a thermo-spectroscope, or, rather, spectrometer, some instrument which will enable them to examine and map out the thermal lines of the spectrum, as accurately as this can be done with the visible and photographic portion. With light (or rather with heat radiated) of tolerable intensity, this would not be difficult to effect. A single row of antimony and tellurium bars, soldered together at their alternate ends, as in the ordinary antimony-bismuth thermo-electric pile, could be securely cemented to a solid plate of glass, and ground perfectly flat. This flat side could then be cemented to a permanent support of glass, porcelain, ebonite, or other suitable non-conducting material, and the other side (after removal of the temporary glass support) should be likewise ground down, until the series of bars was no thicker than a card. This side should now be cemented on to the same kind of supporting material as was used for the other side, and the whole firmly and securely sealed up at the sides, so as to leave only the ends exposed. The end of this pile would now be in the form of a very narrow line, which might be half an inch or so in length, and could consist of the extremities of ten or a dozen couples of antimony and tellurium bars, each not larger than a pin. The two ends of this pile being connected with a very sensitive galvanometer, the pile upon being carried along the ultra-red end of the spectrum, would instantly reveal when a ray of heat shone upon it, by a deflection of the needle, and the comparative intensities of the thermic rays could be at the same time ascertained from the angular distance to which the needle was driven. In this manner heat spectra could be mapped out with considerable accuracy.

ETHER; ITS ORIGIN AND PURIFICATION.

Being Short Lesson in Photography.—No. 23.*

Imperfections in collodion arise more frequently from impurities present in the ether than in the alcohol employed. These impurities consist essentially in acids and water, both of which are exceedingly injurious in the preparation of sensitive and structureless collodion.

Ether and alcohol are congene substances, built upon a compound radical called ethyle, which is still hypothetical, although its constitution is well known. This compound radical contains $C^4 H^5$, that is, four equivalents of carbon and five of hydrogen. Now ether is regarded as the oxide of this compound radical; and its equivalent, therefore, will be $6^4 H^5O$; whilst alcohol, being found to differ from ether only by an equivalent of water, is classified as the hydrated oxide of ethyle, whose equivalent is $C^5 HyO+HO$. It is thus evident that if a single equivalent of water can be abstracted from absolute alcohol, we shall obtain a residual substance containing only ether. There are at present no direct means known by which alcohol can be dehydrated; nor can we convert ether directly into alcohol by adding the requisite proportion of water which ether chemically contains. This shows that there are forces brought into action in the reciprocal conversion of one into the other which we, as yet, have not a perfect control. These forces may produce a difference in the grouping, which may essentially be the prime cause of the difference of constitution of these two fluids; but of the action of these forces we are likewise as yet equally in the dark.

Preparation of Ether.

As before remarked, ether is simply dehydrated alcohol. In order to remove the water from the alcohol sulphuric acid is employed with the application of heat.

The reader cannot be too urgently cautioned against the danger of explosions whilst making the following experiments.

It is advisable to use a sand-bath, and in such a way as to exclude all flame from coming in contact with the retort or condenser during the distillation. A Liebig's condensing apparatus will be found of great service; but should this be not accessible, a long adapter ought to be adjusted to the beak of the retort in order to conduct the etherial vapour as far as possible from all danger that might arise from its proximity with an open fire or flame. The condenser or receiver must be surrounded with ice or snow.

So arranged, introduce into a tubulated retort a mixture of 24 fluid ounces of alcohol and 20 of sulphuric acid; this mixture is previously made in a separate vessel by brisk agitation, and immediately transferred to the retort. The connections are then made with the refrigeratory; and the temperature is raised quickly to about 280° Fah. As soon as ebullition commences and ether begins to distil over, introduce gradually into the tubulature of the retort, by means of a glass funnel supplied with a stop-cock, alcohol in the same proportion as ether

* From *Humphrey's Journal.*

is distilled over; this is easily ascertained by means of a graduated receiver.

Take care to maintain the heat at the temperature indicated; for, if it be lower than this, alcohol will distil over, and if above 300°, sulphurous acid, oil of wine, and olefint gas would pass over; and a large quantity of black material will be generated in the retort from the decomposition of the sulphuric acid and the alcohol into other compounds.

As soon as 76 fluid ounces of alcohol have been gradually introduced by the tubulature, and 84 fluid ounces have distilled over, and white vapours begin to rise into the retort, the process is stopped, and all the parts are allowed to cool.

The fluid in the receiver is crude ether contaminated with a variety of impurities, such as water, alcohol, and sulphurous acid. If the process has been stopped in time, these will probably be all the impurities; but towards the end of the distillation a heavy oily liquid begins to distil over, which, if not prevented, forms another impurity denominated the heavy oil of wine. The latter may be removed, in a great measure, after subsidence by pouring off the supernatant etherial fluid.

Rectification of Ether.

The next process consists in removing all the impurities from the ether. Alcohol is a very common contamination, which is removed by adding about twice the volume of water to the etherial solution, and shaking the mixture intimately in a stoppered bottle. By this operation the alcohol combines with the water, and these two fluids by their superior density soon subside. The ether is then decanted, and contains now about one-tenth its volume of water, which, together with the sulphurous acid, is removed by the following operation:—

Take of a saturated solution of chloride of calcium about 30 ounces; throw into this solution an ounce of fresh hydrate of lime, and add the ether which has thus been freed from the alcohol. The mixture is now well agitated until all smell of sulphurous acid is removed, and then set aside to settle. In this operation the lime combines with the sulphurous acid, and thus forms sulphite of lime, whilst the chloride of calcium, owing to its great hygrometric properties, abstracts the water. After subsidence the ether is decanted and again subjected to distillation until about seven-eighths of the contents have passed over.

The residual quantity in the retort may be mixed with the distillate from the crude materials when ether is again prepared. The ether after rectification in this way, will be found to have a specific gravity of about ·735, and may be still further purified by repeating the operation of distillation over chloride of calcium and lime.

Caustic potassa and carbonate of potassa may either of them be used instead of chloride of calcium and lime; but the best result is obtained by the method described.

When perfectly pure, ether is a very limpid, colourless, volatile liquid; its specific gravity is then ·713; its odour is quite characteristic; and its taste is hot and pungent. It boils at a temperature of about 95° Fah. Its extreme volatility causes it to evaporate very rapidly when exposed to the open air; and the rapidity of the evaporation gives rise to great cold. In like manner it is exceedingly inflammable and gives rise to the same products as those arising from the combustion of alcohol, namely, water and carbonic acid. Its flame is yellowish white. When long kept and exposed to diffused light it is apt to undergo decomposition into acetic acid and other etherial compounds. This species of decomposition is frequently manifested in old collodion not only by the colour which it imparts to this substance, but also to the peculiar etherial smell which is recognized in the silver bath after long use. Ether is a powerful solvent; most of the resins, the fixed and volatile oils, iodine, bromine, sulphur, phosphorus, gums, balsams, tannic acid, several of the alkaloids, corrosive sublimate, chloride of gold, &c., are dissolved by this menstruum.

Chloride of gold is obtained in a very pure condition for toning purposes by first evaporating the solution of gold in aqua regia to dryness, then dissolving the residue in water, and afterwards agitating it with a quantity of ether, which dissolves the chloride and separates it from the water. The etherial solution of gold, after subsidence, is decanted and preserved in closely stoppered bottles for use. Bichloride of platinum can be separated in the same way.

Testing Ether for Impurities.

Acids are recognized by means of blue litmus paper, which turns instantly red where any acidity is present. As before mentioned, the acids which may generally be found in ether are sulphurous acid and acetic acid, the former a product arising in its preparation, and the latter from the spontaneous decomposition of ether. These acids are removed by means of lime, potassa, or its carbonate.

A high specific gravity of the ether indicates the presence of water; besides, ether which contains much water has a tendency to thicken collodion rather than to thin it: collodion, after treatment with an aqueous ether, is apt to produce ridges and fleecy flakes in the film on drying, and thus becomes unfit for photographic purposes. Ether which contains water will leave the vessel moist from which a few drops have been allowed to evaporate spontaneously.

Water is removed from ether by adding to each quart about 4 ounces of recently-burnt lime in a pulverulent state. The mixture is kept closely stoppered and is frequently agitated for several days; after subsidence the supernatant fluid is poured off and about seven-eighths of the quantity to be distilled is allowed to pass off when the process is stopped. The distillation is performed by means of a water bath and with all the precautions already alluded to.

We have no reliable means of testing for the presence of alcohol; we may, however, in general rely upon the fact of its being present in all the ordinary samples of ether. All the specimens of ether whose specific gravities range above ·713 contain more or less alcohol. This impurity may be removed at the same time with the water by adopting the mode of distillation over chloride of calcium, as recommended in its rectification. For the photographer the presence of pure alcohol is no injury, so that the distillation of ether, after first digesting it over freshly burnt lime, will render it quite suitable for the preparation of photographic collodion.

Oil of wine is detected by the milkiness which is produced when ether is mixed with water. It is removed at the same time with the alcohol by washing the ether with water, allowing the heavier fluids to subside, and by distilling the lighter fluids after digesting them over lime.

Physiological Effects of Ether.

Vegetables quickly lose all vitality when immersed in ether. The effects of ether on animals are somewhat analogous to those of alcohol, but much more rapid and transient. The first impressions caused by ether when taken into the mouth and swallowed are those of burning both in the mouth, throat and stomach. Spasms soon yield to its influence when so administered, and flatulence is relieved by it. It is regarded as an excellent remedy against sea-sickness. However administered, whether by absorption from the alimentary canal or by inhalation through the lungs, it enters the circulation with rapidity.

When thus absorbed it seems to act like alcohol as a cerebral excitant, without producing, however, any increase of temperature or pulsation. Its action in this respect has more resemblance to that of the protoxide of nitrogen, which, instead of exhilarating, is depressing—such has been the result of our experience with laughing-gas for at least twenty years. When taken in large doses it is said to produce intoxication, and in excessively large doses it gives rise to nausea and stupefaction. Ether is one of our most powerful anæsthetics, paralyzing the functions of the brain with great rapidity, and thus destroying all sensibility. To effect this purpose it is breathed in a diluted state from a silk handkerchief which has been previously impregnated with this fluid. The handkerchief being held near the nose and mouth, the vapour of ether is inhaled in combination with atmospheric air, and soon begins to manifest its effects on the brain by producing giddiness, stupefaction and, finally, complete insensibility.

In surgical operations chloroform is used in preference; we believe, too, that patients all prefer chloroform to ether, from the fact that the subsequent effects of chloroform on the system are more tolerable than those of ether. After an operation of the nature comprehended in the text, the odour of ether will be perceptible in the breath of the patient for several hours, and its nauseating effect is sometimes of the same duration.

Photographic Uses of Ether.

Pure ether and alcohol dissolve pyroxyline and produce a transparent, colourless, limpid fluid. If water be present, this fluid, commonly called plain photographic collodion, becomes slightly gelatinous; and by further additions of water the collodion becomes thicker, woolly, then coagulates and deposits a

fibrinous white residue like the cotton originally dissolved in the two fluids.

The properties of alcohol and ether in collodion are opposite; the latter renders the film more glutinous, tenacious, adhesive, and compact; whilst the former has a contrary action and destroys the adhesiveness of the particles, renders the film structureless as if formed of the finest pulverulent material in one thin aggregated layer possessing but feeble attraction amongst the particles. A film containing too much ether can be stripped off from the glass in one complete piece; when the alcohol predominates, the film is said to be structureless and even rotten, but it adheres more firmly to the glass. A larger quantity of pyroxyline can be dissolved when alcohol exists in larger quantity than ether; in this case three per cent. by weight can easily be dissolved without producing any deposit; on the contrary, when ether predominates, scarcely more than two per cent. of the prepared cotton can be dissolved in the mixed etherial fluids.

From a knowledge of these facts the photographer will be enabled so to temper his collodion as to produce any desired result.

PHOTOGRAPHY IN THE FIELDS.

BY REV. H. J. MORTON, D.D.*

Photography has realized some of the dreams of those ardent lovers of nature, who have long been waiting and wondering, and almost despairing of accomplishing the ends they aimed at. They felt that there was a vast amount of mere conventionalism in most painting. They wondered it should be so; they waited to see if it would not be avoided; they almost despaired of any remedy. Such and such touches stood for leaves; they were not leaves either in shape or detail, but they stood for leaves, and were accepted as leaves. Certain daubs of colour or strokes of brush stood for the bark on tree trunks; other daubs and strokes stood grass or rock-surface. But, after all, these things were only suggestions, not actual representations of the objects. And how was it possible that it should be otherwise? How could any mortal hand paint any real natural forest? A painter might sit down before a reach of woods, and paint "from dawn to dewy eve," beginning in early youth and painting persistently till he and the forest grew old together, without hope of rendering all he saw. Realizing this, the task was abandoned, till the pre-Raffaelites took up the forsaken work, and by limiting their scrutiny to a little bit of nature, contrived to present the world with very fair copies of tufts of grass and handbreadths of waysides. They painted pictures which it made one's back ache even to look at, so terrible was the evidence which they exhibited of intense and elaborate toil. But these did not satisfy. Then photography started up like a spirit, and came into the midst of the toiling group, bending painfully over their work, and said, "Stand aside, gentlemen, if you please. Let me show you how to paint Nature." In a moment, in the twinkling of an eye as it were, she handed over her work, and lo! there was the wood with every tree-trunk perfectly copied, every leaf accurately represented, and every stone standing overshadowed by tall ferns, or cushioned in soft moss! The group of painters put out their pipes simultaneously, and pored eagerly over the production of this strange spirit! It was a real thing and perfect. Not a bug had crawled over a tree-trunk, but this spirit had caught him, and transferred his image to the surface prepared for his reception. Not one little quiet shadow had the sun made by means of the rugged excrescence of a fragment of oak-bark, or the overhanging of a leaf, but the spirit had marked it, surprising, ere it could escape, and fixing it ere it could fade! The admiring spectators admitted that the work was wonderful, and relighting their pipes, resolved that this spirit should help them in their after toils, and secure for them studies of nature, not otherwise attainable.

But photography has done more than this. The nimble-fingered spirit has contrived to grasp motion. The painter had to guess at many things, particularly at moving things. The falling wave changed while he watched it, and was never the same thing long enough to allow him to draw a single line accurately. It tossed and trembled before him, and seemed to defy his efforts to portray it. The clouds, too, smiled at his endeavours to picture them. He saw the expression as it came on the majestic vapour-masses; but as he lifted his head to look again, the smile had melted away, and a frown supplied its place. And so the clouds trailed away, and twisted their long waving skirts, and left the baffled artist to admire and despair. But this swift spirit was too quick for the clouds, too nimble for the falling wave; it caught the combing surf in the very instant of its plunge, and treated the clouds as though they were marble things, and fixed on pedestals to wait its pleasure.

With such a wonderful helpmate at their beck and call, we are amazed that all artists are not photographers, and that any photographer is ever content to sit at home, and copy prints or even paintings. Of course, there is use in this work.

It is well to reproduce good prints at small cost, and repeat, in a general way, the paintings of distinguished artists so as to give some idea of the composition and character of their work. But what is this in comparison with representing and actually reproducing the etchings of the Almighty on the rocks, and His mouldings, and carvings, and textures in cliffs, and hill-sides, and velvet mosses? Think of carrying home the exact forms of things which His hand has fashioned, and the magical effects in light and shade which He has arranged!

And then the glorious open air life of the photographer! His life amid the silent woods, where the shadows sleep so calmly; on the hill-side where the sunbeams rest so broadly and brightly; by the deep quiet lake, where the leap of the fish and his flashing fall into the broken mirror beneath, alone interrupt the profound stillness and repose of the scene; or by the sounding shore, where the sea waves cast themselves upon the sand, as though weary with their ceaseless tossings, and rake with their white foam-fingers among the pebbles, and finding nothing, as it would appear, glide back murmuring to the next wave their disappointment and regret! All this not without toil. It would not be worth anything, if it did not exact effort, and demand judgment, and exercise skill. Sometimes the work is hard. But then the result is so wonderful and so perfect!

We have had some little experience in this out-door's toil as an humble helper, and confess to aching bones and weary back as the issues. We remember one series of views taken in the bed of a torrent, the banks of which were almost perpendicular, and an hundred feet high. The bottom of the glen was absolutely chaotic. Unlike Jerusalem after its overthrow, where not a stone was left upon another, no stone but was on the top of another. The possibility of pitching a tent was debated, and the attempt to effect it was made but to no purpose. A stream of light would creep in behind the operator, after the most careful adjustment of the curtain, and then, when that was shut out, there would be other rays, like little boys around a show on the commons, sure to crawl in at another crevice, and disturb the performance. So the tent had to be pitched on the top of the ravine, and the plates after exposure at the bottom to be hurried up to the bath at the summit. It was a breathless scramble. A hot August day gave the operator a bath as well as the plates. But then the result was perfect. There were the overwhelmed rocks in all their grotesque ruggedness, and there was the wild mountain stream, twisting among them like a mighty snake, and leaping up here and there in foam and hissing spray, like an angry and living thing. Recent ingenuity has remedied these difficulties, but still it needs patience and much endurance to do the work well. How abundantly the results repay labour when the work is well done. The world has ceased to be *astonished*, but it has not ceased to be *delighted* with the triumphs of the new art; and

* From the *Philadelphia Photographer*.

still more glorious victories, we do not doubt, are yet in store for its devoted students. We have now all glory of grand Rembraudt's light and shade, and more than pre-Raffaelite delicacy and exactness of detail. We look in hope of yet seeing the exquisite tinting of Nature reproduced, and Titian and Turner excelled in colour, as much as they are in accuracy of form and minuteness of detail.

THE FADING OF PHOTOGRAPHS.

BY P. C. DUCHOCHOIS.*

The great defect of photographs—the only one—is the fading of positive proofs on paper. Long ago the attention of eminent photographers has been called to this subject, and by their labour the causes of fading being now well understood, it can be easily avoided; toning first by a deposit of gold, and fixing afterwards the proof, is certainly the right process. But although it is exclusively employed, it is astonishing that almost all photographs made lately on albumen paper fade in an incredibly short time.

This can partly be accounted for by the improper mode of washing, the great amount of prints fixed in the same bath, and by this fact, that many photographers think that a proof toned with gold, and fixed by a short immersion of fifteen or twenty minutes, cannot undergo sulphuration, even in a bath of hyposulphite of soda a day or two old, which is often used to obtain more brilliant and pleasing tones.

This is certainly a great error: hyposulphite baths are so quickly in a state of decomposition when many proofs are fixed at a time, that a beginning of sulphuration can be remarked in a few hours, the solution turning slightly milky by liberation of sulphur.

This sulphuration is, without doubt, increased by the omission to wash the toned print before fixing. When the gold toning bath was first introduced, this very important part of the process was recommended, but is now entirely suppressed, being seldom mentioned in treatises on photography. However, it is well known that chloride of gold, in presence of hyposulphite of soda, forms a double salt of hyposulphite of gold and soda, chloride of sodium, and tetrathionate of soda, which is a very unstable salt, liberating sulphur.

But it is a more important cause of rapid sulphuration, which is the object of this communication. New albumen, especially from fresh eggs, gives very little gloss, and in order to obtain that great brilliancy of surface—so little artistic, but so much desired—it is recommended to employ an old, very old albumen solution, which, consequently, is more or less in a state of decomposition; but by decomposition of organic matters, containing sulphur, sulphydric acid is formed, remains in some form in the paper, and reacts on silver salt to form sulphuret; on such paper, sulphuration, of course, cannot be avoided, and it is so rapid that, the greatest care being taken for fixing, the proofs are already faded, even after the ten or twelve hours of immersion necessary to remove the hyposulphite of soda, as can be seen by those now presented to the society.

It is also for this very reason that papers prepared in summer often turn dark brown soon after sensitizing, while those albumenized in winter remain very white; but the colour and keeping qualities of silvered paper cannot be depended upon as a sure sign of the albumen being free from decomposition, and it is advisable to immerse the fixed proof in water for forty or sixty hours, as a practical test.

* Read at a meeting of the American Photographical Society, March 14, 1864.

Correspondence.

THE NEW CARBON PROCESS.

Dear Sir,—I read with great interest your remarks in last week's News on the decomposition of the gelatine solution, and as I have latterly met with almost the same results, I thought a few corroborative remarks would not be out of place, as it will show that your experience is not an isolated one. The first time I met with it was in a rather curious way; I had mixed a large bottle full of gelatine and sugar, and used small quantities of it with pigment as I wanted it; I was then engaged in experiments on different pigments; about ten days after its preparation, I received from Messrs. Reeves some colour to try; I mixed some of it with the gelatine, and was much surprised to see that it would not gelatinize *at all*.

As was natural, I attributed it to the pigment, but the following day, on examining the stock bottle, I found the contents in a state of liquefaction, and containing portions of gelatinous matter, which, from after experiments, I found to be nearly insoluble in water. I proceeded to prepare some portions of tissue with the decomposed solution, and, contrary to your experience, Sir, the tissue, although taking some time to wash off, gave very fair pictures. For the last fortnight, I have been dreadfully troubled with insoluble films, both from gelatine solution freshly prepared, and at all stages of decomposition; in fact I have not been able to get a single picture. I have used six different samples of gelatine, varying from common to the finest, with the same results. The curious part of the matter is, that three of the samples gave satisfactory results a month ago. I have employed the same bichromate of ammonia for all; in fact, it is the only thing that I have not changed.

I intend trying the six samples of gelatine with a small quantity of glycerine, and, as a last resource, changing everything I have used, as I am much vexed at not being able to discover the least cause for the curious phenomenon.

Yours truly, H. Cooper, Junior.

PERMANGANATE OF POTASH AS A TEST FOR HYPO.

Sir,—I hope you will not think a few words out of place on a communication in your last impression on "Washing Prints, and Test for Hyposulphite," from your correspondent signing himself "N."

I was at once struck on reading the above paper with the fallacy of the test when used in the way there described, and which is calculated wofully to mislead any photographer who may not at the same time be a chemist. In the first place, "N" appears to have entirely overlooked the fact that solution of permanganate of potash is decomposed by all organic substances, therefore, the effect described by him was not due to the presence of hyposulphite, but to the paper itself. Again, the greater effect of the blotting-paper is easily accounted for as being more porous, it would allow the solution to permeate it more readily, and as it were give a greater reducing surface to act on it.

The above remarks are demonstrated by the following experiment:—

Into ¼ litre of filtered spring water I poured 10 CC. of decinormal solution of permanganate of potassa, and 10 CC. of normal sulphuric acid, afterwards adding water to make up to ½ litre. I then took four test glasses.

In No. 1 I put 50 CC. of solution as above.

In No. 2 50 CC. of solution and 5 grammes of the white sky of a fixed and well washed print.

In No. 3 50 CC. of solution and 5 gramme of Canson's thin negative paper.

In No. 4 50 CC. of solution and 5 gramme of clean filtering paper.

I left them for two hours, and on my return found the solutions present appearances as follows:—

No. 1. A beautiful violet.

No. 2. Light red, rather cloudy.

No. 3. The same.

No. 4. The same, solution rather more muddy.

This experiment completely confutes the conclusion arrived at by "N" that his print contained hyposulphite because it decolorized solution of permanganate of potash, as no hyposulphite could by any chance have come in contact with the papers I used in No. 3 and 4 glasses.

A very simple comparative experiment might be deduced from the above by placing a given weight of the same paper

used, but neither albumenized nor salted, in one glass with some of the test solution and the same weight of the sky of a fixed, washed, and dried print, in another, then, by watching the difference of colour produced in a given time in the two solutions an approximate conclusion might be arrived at as to the absence of hyposulphite in the fixed and washed proof. For instance, I took three glasses:—

In No. 1 I put 50 CC. of test solution.

In No. 2 50 CC. of solution and 5 grammes of plain rive paper.

In No. 3 50 CC. of solution and 5 grammes of the sky of a fixed and (purposely) imperfectly washed print.

After the lapse of one hour I found the followiug results.

No. 1. A fine violet.

No. 2. A reddish violet, the solution getting cloudy.

No. 3. A brick red, solution very cloudy.

I have for some time past intended commencing a series of experiments, as to the possibility of eliminating, or rather decomposing the last traces of hyposulphite from prints, by treatment with dilute solution of iodiue, but up to the present have been unable to do so from want of time.

The composition of hyposulphite of soda is represented by the following formula:

$$NaO.\ S_2O_2 + 5\ HO.$$

When brought in contract with solution of iodine, the hyposulphurous acid takes oxygen from the water, and the result is the production of tetrathionate and hydriodate of soda.

$$2\ (NaO.\ S_2O_2) + I = NaI. + NaO.\ S_4O_5.$$

Salts easily removeable by washing. If, therefore, afer a partial washing, we introduce the prints into a dilute solutiou of iodino (made by adding a strong solution of iodine in iodide of potassium to water until just tinged), and remove them immediately, a slight blue tinge is perceptible on the back of the print, as will always bo the case iu foreign paper sized with starch; there will, I think, be very little fear of any hypo being left in the print. Of course, after this treatment, the priut must be well washed in several changes of water. I enclose a small print of a gun-shot wound of the crauium, treated iu this manner, and hope shortly to experiment further on the subject.

I connot conclude without a few remarks on that great boon to photographers, the lime bath. In September 1863, shortly after the publication of Mr. Parkinson's formula in the News for that month, I made a bath as follows:—

Chloride of gold	... ...	... 12 grains.
Hypochlorite of lime	...	... 12 ,,
Carbonate of lime (chalk)	...	... 80 ,,
Boiling water	... ...	... 4 pints.

When nearly cold, I added two drachms of acetate of soda.

This bath I have used ever since, with the occasional addition of water, aud equal portions of solutions of chloride of gold and hypochlorite of lime (each of the strength of one grain to the fluid drachm), as the bath loses streugth by use. Since I have used this I have never been troubled with mealy prints, or any other toning nuisance, and it works equally well now as it did the first day of preparation. I seud you a print or two toned with it.—I have the honour to be, yours obediently, William A. Moss.

Royal Victoria Hospital, Netley.

"MAGNESIUM WIRE."

Sir,—We have had our attention directed to the letter from Mr. J. Solomon, which appeared in your issue for last week, complaining of the non-fulfilment of the promises made to the public respecting the supply of magnesium wire, and we are anxious, not only to apologise for such non-fulfilment, and, by your permission, to explain the causes thereof, but also to exonerate Messrs. Johnson, Matthey, and Co. from whatever blame may be considered as incurred.

The facts are as follows:—Some three months ago, we began our preparations for manufacturing magnesium, under Mr. Sonstadt's patents; these preparations necessarily took up some time, so that it is not till within the last few weeks that the metal has been produced in any quantity. We found that we were able to obtain the metal in any required scale, aud one of us, who undertook the manufacture of it into wire, considered his experiments so satisfactory that, on the strength of those experiments, together with the certainty that all difficulties as to the commercial productions of the metal had been overcome, arranged with Messrs. Johnson, Matthey, and Co., to supply them immediately with the wire, in any required quantity. When, however, it was required to produce the wire in quantity, the method whereby it had been obtained (the method originally devised by Bunsen, of pressing the metal, while hot, through a small hole) was found impracticable, except under conditions very difficult to obtain with certainty. Now, there are two methods whereby metals may be made into wire; one method is that above mentioned, of pressing; the other is that ordinarily followed, with the metals of commerce, that of drawing. Now, the former method, and the ouly one that has yet been essayed with maguesium, appears to be essentially faulty when applied on any considerable scale, and, consequeutly, we are bending our efforts to the *drawing* of magnesium into wire. That we shall succeed in doing this we have no doubt, and, this done, our promises to the public will be amply redeemed. In the meantime, pending our experiments, we must ask a short, and, we trust, it will need to be but a very short, indulgence from the public. With respect to Messrs. Johnson, Matthey, and Co., we trust they, at least, will now be completely exonerated from blame. —We are, yours, &c. Mellor and Co.

Magnesium Works, Salford, Manchester, May 25th, 1864.

Photographic Notes and Queries.

Retaining the Specimens of Operators.

Dear Sir,—As this evil seems to be on the increase, I feel that it cannot bo too well exposed; permit me, therefore, to inform you how I have been served.

On the 13th inst., I replied to an advertisement I saw in your paper of that date, for an appointment as operator. As specimens were requested to bo forwarded, I enclosed the only cartes I possessed, nine in number, with a request that they might be returned by the next post. I waited until Friday last, and then wrote again for my photographs, but have not received any reply. I trust, sir, you will give publicity to theso facts, so that operators in general may be guarded against such dishonest tricks.—Yours very respectfully, Fair Play.

P. S.—I euclose my card.

24, *Stangate, London, S., May* 25, 1864.

[We can scarcely think that this practice is a common one, or that it arises from other causes than carelessness. There are two suggestion which may be of service in the matter. Iu tho first place, on the assumption that it is simply the result of neglect, if operators, in sending out their specimens, encloso at the same time a stamped and addressed envelopo, it will doubtless facilitato the return of their pictures. To meet cases, if any such exist, where the specimens aro appropriated, becauso they aro pleasing, let the operator write his namo across tho background of the pictures he sends away. This will not hinder an employer from forming his judgment of the work, but will render the print useless to any one but tho operator.—Ed.]

The French Photographic Exhibition.

Sir,—The following paragraph I have taken from your Paris Correspondent's notice of the above exhibition in the last number of the News.

Perhaps the gem of the exhibition, in the class of views, is a collection of 33 pictures, 12 by 10, unnumbered and unnamed, but which are evidently English subjects; they surpass any and everything hitherto exhibited of the kind, in the representation of herbage and foliage; they belong to

Nature's pre-Raphaelite school, and do the artist infinite credit. I regre that I cannot give his name. I shall not be surprised to learn that they proceed from the hands of an adept in the tannin process.

It is so singular that these pictures are "unnumbered and unnamed," that I beg you will allow me to supply your correspondent with the information that they are mine—that they comprise the series of Windsor, Frogmore and Thames views, you are familiar with—and that they are all wet collodion pictures produced and developed in the manner you mentioned in the News Almanac. How glad I should be if I could obtain the same results with tannin or any other of the "keeping" processes.

May I take this opportunity to say that I regret very much that I have no pictures at the exhibition of the Photographic Society, in Pall Mall? In common with very many others, I was shut out by the new rules, as all my landscapes have skies printed in from separate negatives, and are therefore not the result of "one negative."—I am, &c., Vernon Heath.

43 *Piccadilly, June 1st*, 1864.

[We have already expressed regret that we did not see any of Mr. Heath's charming pictures in the London Exhibition. There are many pictures there from two negatives, and with skies printed in from separate negatives, which will not, we presume, be eligible for the medal competition; and some with skies painted on the negatives, a less legitimate expedient which will, we presume, be eligible. We trust that, notwithstanding the discouragement which the medal arrangements tend to throw on the use of more than one negative, that no artistic photographer will in future exhibit a white sky, when so simple and justifiable an expedient as an extra printing will remedy the evil.—Ed.]

Miscellaneous.

Refractive Power of the Eye.—By the refractive power of the eye, objects situated a little behind us are seen as if they were on a straight line from left to right. Pictures of external objects, which are represented on the retina, are included in an angle much larger than one-half of the sphere at the centre of which the observer is placed; from this point of view a single glance encompasses a vast and splendid panorama, extending to an angle of 200°. This is the result of the common law of refraction. All the rays of light passing through the cornea to the crystalline lens are more and more refracted, in proportion to the angle at which they strike the spherical surface of the cornea. Consequently, the only objects which are seen in their true position are those entering the eye in the direction of the optic axis. By this refraction the rays which enter the eye at an angle of 90° are bent at 10°, and appear to come from an angle of 80°. This phenomenon produces a very curious illusion. When we are lighted by the sun, the moon, or any other light, if we endeavour to place ourselves in a line with the light and the shadow of our body, we are surprised to find that the light and the shadow seem not to be connected at all, and that, instead of being in a line, they appear bent to an angle of 160° instead of 180°, so that we see both the light and the shadow a little before us, where they are not expected to be. The eye refracts the line formed by the ray of light and the shadow, and the effect is like that of the stick, one-half of which being immersed in water, appears crooked or bent into an angle at the point of immersion. This enlargement of the field of vision to an angle of 200° is one of those innumerable and wonderful resources of nature by which the beauty of the effect is increased. Our attention is called to the various parts of the panorama which appear in any way a desirable point of observation, and we are warned of any danger from objects coming to us in the most oblique direction. These advantages are particularly felt in our crowded towns, where we are obliged to be constantly on the look out for all that is passing around us.

Photographs of a Lifetime.—One of the most interesting results of the ease and cheapness with which photographs are produced is the prompting which it will give many persons to have their likenesses taken frequently during their lives. What would a man value more highly late in life than this accurate record of the gradual change in his features from childhood to old age? What a splendid illustration would such a series of photographs make in every household. First, the new-born babe in its mother's arms; then the infant creeping on the floor; next the child tottering by the mother's apron; then the various phases of boyhood, till the spronting beard tells of the time when the plans and hopes of life began to take form and purpose; another portrait with softer locks and eyes is now coupled with the series, and the stern warfare with the world begins; the features henceforward grow harder and more severe; lines slowly come into the forehead and grey hairs mingle with the locks; the lines grow deeper and the head whiter, till the babe is changed into the wrinkled and grey old man, so different, but still the same. Even when life is closed the power of the photographer has not ceased. The fixed features that return no answering glance to the last fond look of surviving love are caught and indelibly preserved to its memory.

The Separation of the Rays of Heat from those of Light in the Eye.—Our readers are aware that the sunbeam consists of three elements—light, heat and the chemical rays. A paper has recently been communicated to the French *Academie des Sciences* by M. J. Janssen, giving an account of a series of experiments undertaken by him, to ascertain how large a portion of the *heat* rays pass through the central portions of the eye and reach the retina at the back. His experiments show that *all* the rays of heat are absorbed before they reach the retina—two-thirds by the cornea and the other third by the aqueous humour.

Talk in the Studio.

Stealing Lenses.—On Friday last, George Ursell, a photographic printer, was charged before a magistrate at Leamington, with stealing three lenses and a rolling press, the property of Mr. H. P. Robinson. The prisoner had been in Mr. Robinson's employment about twelvemonths, and left in February last. Shortly after he left, some of the property was missed, and the remainder a few days ago. Information having been received of Ursell having offered the lenses for sale, the matter was placed in the hands of the police, and he was apprehended at Cheltenham, on which he made a very determined attempt to cut his throat. The case having been proved, Mr. Robinson, the prosecutor, asked that the case might be dealt with leniently, as the prisoner had a wife and family. The case was remanded, therefore, with a view to complete the case, and deal with it summarily, instead of committing the prisoner for trial. On Wednesday, the case was again brought before the bench. The magistrate remarked, that Mr. Robinson having recommended the prisoner to mercy, he would be dealt with leniently. The sentence was three months imprisonment with hard labour.

Liebert's Solar Camera.—The *Philadelphia Photographer* states that the solar camera, described to the French Photographic Society, a few months ago, by M. Liebert, as his own invention, was really the production of Mr. David Shive, of Philadelphia.

The New York Sanitary Commission Fair.—The New York illustrated journals have been filled with articles and engravings relating to this fair, at which photography seems to have played no unimportant part. Messrs. E. and H. T. Anthony presented a magnificent pearl album, of which an engraving is given in some of the papers. It sold for 150 dollars. The *New York Illustrated News* gives a portrait of Mr. L. A. Furlong, "the celebrated positionist and photographer for Gurney and Son, at the Sanitary Fair." Mr. Furlong is a gentlemanly, intelligent-looking man, and has "positioned" himself leaning upon a camera.

A Kaleidoscopic Camera.—A correspondent of the *Scientific American* says:—"Everybody is familiar with that little instrumen invented by Dr. Brewster, and called a kaleidoscope. To the eye of the observer it presents an infinite variety of forms and colours, which, though ever changing, are yet always beautiful. Let the photographer once combine the kaleidoscope with the camera, and then see with what ease and rapidity he can produce the most charming designs for dress goods, tapestry, oil cloth, wall paper, and numerous other purposes. Such a thing is possible.

To Correspondents.

W. C. J.—A lens of long focus will give you better definition all over your pictures than one of short focus, and for standing card pictures the longer focus is desirable. Probably *b* will answer your purpose best.

ΦΙΛΟΦΟΤΟΥΣ.—The sesquichloride of iron is not likely to be commonly kept by chemists, but may, probably, be obtained of manufacturing photographic chemists. We recently had some from Busch and Co., whose address you will find in our advertising pages. It is made by treating the sesquioxide of iron with hydrochloric acid. You may use the spirituous solution if its strength, as indicated by the specific gravity, be the same as given in the formula.

SPOTTY.—Your negatives are considerably over-intensified, which destroys modelling in the face, and produces a patch of white. The mottled white effect which appears in the background of the group is most likely the result of a dirty plate. The black diagonal lines are the result of scratches on the film. The white spots may be touched out by using a mixture of sepia, indian ink, and purple madder. The line of spots is most likely caused by dust from the hinge of the shutter of your dark slide. The lens does not appear a very good one.

BEXLEY.—If you intensify after fixing, there is no need to fix again. You may, if you choose, add more gun cotton and more alcohol to your collodion, but it is by no means certain that you will improve it.

H. WILMOT.—The silver in waste developing solutions will gradually be reduced and settle as a metallic powder if left to stand, but is a simpler plan to mix them with the waste hyposulphite to be precipitated as a sulphide, and reduced afterwards. 2. The simplest and best way to enlarge a quarter-plate picture to life size is by means of the solar camera. If you place the negative in an aperture of the shutter of a darkened room, then throw the image on a sheet of sensitive paper, you will require an enormous exposure, even by development printing. You may, if you choose, produce an enlarged negative, as described in our YEAR-BOOK. 3. It is not necessary, after washing in two or three waters, to use salt and water before toning.

M. A.—We fear the case is not hopeful; but you may now try a solution of sulphide of ammonia, and blacken the deposit.

LENS.—No. 1, 2, and 3 are of presumedly similar construction, but are not the same. No. 6 and 7 have no similarity to the others. Nos. 8 and 9 are neither like these mentioned, nor like each other. The name of No. 8 is not derived from having been used by the gentleman referred to. We prefer No. 1 for one purpose, and No. 9 for another. We have not much confidence in No. 3 generally. We have not tried the last you name, but have no reason to believe it better than the first.

M. A. O.—The list of members of the Exchange Club will appear, probably, in our next. We will then remember your request. The publication of the list has been delayed in the hope that the number would be increased if we waited.

NETLEY.—The only certain mode of testing a sample of pyroxyline is to make it into collodion and try it. So far as a general examination of that you enclose goes, it appears very good, and is readily soluble.

PETER GRIFFITHS.—The prints have, probably, been imperfectly immersed in the hypo; or, it is possible, that some trace of hypo has been in some of the vessels in which the prints have been placed previous to fixing, or that some person has worked with hypo-stained hands. The mischief is due to hypo.

TROVEY.—The mode of producing transparencies, described by Mr. Blanchard in our last YEAR-BOOK, will give very good results on opal glass. The glass can be had of most dealers in such material; but we do not know where best.

PURE NITRATE OF SILVER.—The term silver markings is too indefinite to enable us to point out their cause. Your collodion being red may make it work slowly, but it will, especially for collodion positives, be likely to work cleanly. There is no reason why the double sulphate of iron and ammonia should not give you a clean, even deposit. The object of adding acetate of soda to a nitrate bath is to form acetate of silver, which tends to give greater density of image. The advantage to be gained by adding acetate of soda to the negative iron developer would be the formation of acetate of iron, giving increased density in the image. We do not recommend the use of either. A solution of ammonia-nitrate of silver gives greater sensitiveness in printing than plain nitrate, but it is more troublesome to work with. A solution of plain nitrate of silver containing from 40 to 60 grains per ounce, will generally give good results.

J. INSKIP.—You will find the address of several refiners in our advertising columns; we cannot state which is best. The price varies according to the proportion of the precious metal present in the sample of waste. If you have a large stock the best plan will be to send a fair sample to some refiner, and ascertain the price per lb. he will give you for the bulk. The card enclosed is very perfect indeed, all parts of the manipulation are excellent.

ONE IN DIFFICULTIES.—There are so many causes which will produce pinholes, that it is very difficult at any time to fix the precise cause, without carefully going through all. In your case it is very probable, indeed, that the glasses are the cause. There is always considerable uncertainty in using glasses which have been used before, especially if the old film have been dried on, and still more so if it have been varnished. It often happens that glass has small imperceptible inequalities and holes in the surface, which afford a lodgment for the nitric acid you say you use in cleaning, and this would be an effectual cause of spots. Dust, an over-iodized bath, and a variety of other things, will also produce the defect. As a rule, there is less tendency to this trouble with a freely bromized collodion. Add about half a grain of bromide of cadmium to each ounce of your collodion. Your negative is a little under-exposed.

J. W. S.—Probably Negretti and Zambra will best supply what you require.

TANNIN PROCESS.—We have not met with in tannin plates the blurring or halation you describe; but Major Russell prescribes more bromide in the collodion, and a weaker tannin solution as the remedies.

R. H.—We receive more complaints of toning difficulties arising out of the use of carbonate of soda than arise from any other single cause. We strongly condemn the use of carbonate of soda in toning, as being, except in practised hands, exceedingly troublesome and uncertain. The acetate bath is in most hands the most safe and certain where warm tones are required, and for black tones there is nothing so simple to prepare, and easy to succeed with, as the lime bath. We have used for some time back a solution containing 2 grains of chloride of gold, 3 grains of chloride of lime in 10 ounces of water. It was ready for use in three days after mixing, and worked well at the end of three months. Your untoned print is a virulent specimen of mealiness, arising from using the toning bath too soon after it was mixed. We have not tried M. Meynier's toning bath. The sulphocyanide of ammonium has not yet, we believe, been introduced into this country as a commercial article, but will shortly.

DOUBLEFF.—We have not had much experience in packing negatives; but we should be inclined to place sheets of smooth soft paper between each pair of plates, and pack them in parcels. In grooved boxes they are apt to be broken in carriage. 2. It is better to roll prints after mounting. 3. We have used rolling machines, both with steel bed and glass bed, which have answered well, but we rather prefer the latter. We have not tried those which are heated, but have seen very good results produced by them. 4. For plates up to the size you name, Blanchard's manipulating box will answer well. 5. We are uncertain, without testing. 6. The sensitized dish described in the YEAR-BOOK is the kind used in Mr. Blanchard's establishment, where several thousands of prints are produced every week, and he states that it answers perfectly in all respects, neither leaking nor injuring the solution.

A YOUNG BEGINNER.—With a perfectly corrected lens, used with its full aperture, you will get perfect definition over a very limited space, and that only on one plane. By employing a stop you will extend the area of definition and the depth of focus, but you do not necessarily improve the definition of the part which was in perfect focus with full aperture, although with some lenses you improve the general definition by using a small aperture. We prefer that you mention first.

W. H. S.—The image vanishing when the varnish is applied is generally due to two causes, both present together: the collodion is made of a sample of pyroxyline which is to some extent soluble in alcohol, and the varnish is made with very highly rectified spirits. The same sample of collodion may not be injured by another sample of varnish, and another sample of collodion may not be attacked by the same sample of varnish. Sometimes leaving the bottle of varnishing open for a few days to allow it to absorb moisture, or the addition of a few drops of water to the varnish, will effect a cure; or the use of a benzole varnish will make the matter safe. 2. Your card lenses will, in all probability, answer for instantaneous views.

PYAO.—Your plan appears pretty good; it would have been better if you could have had some glass on the west side, as you at times feel the need of it.

PHOTO.—We fear, from your statement, that you are victimized. The shop is closed, and the man is not to be found. There are other dark circumstances in the case, of which more will transpire shortly.

S. C. C.—See answer above. Nothing more has transpired.

W. T. S. HALE.—We fear you are in the same position as "Photo." See answer above. We hope you have retained possession of the lens, bad as it evidently is.

JOHN LOSH.—Your dark slide, with the shutter opening inside the camera, is ingenious, but will be apt to act as a fan to disturb any dust in the camera, we fear. Have you found this?

EDUCATOR.—We have delayed answering your queries regarding Mr. Blanchard's article, that we might refer it to that gentleman himself, as he has recently had much practice in working the method of producing transpareneies described. He says:—"The yellowish tint referred to is caused by the thinness of the positive before intensifying. The remedy is to use less bromide in the collodion, or collodion with free iodine added, until of a very deep brown sherry colour. In all cases where mereury is used overexposure will always cause failure, for a certain amount of density is needed to start with. The other stains mentioned were doubtless caused by using the hydro-sulphate of ammonia too strong, or, possibly, from not washing sufficiently before drying. In most cases, after intensification or toning, spontaneous drying is very objectionable."

AMATEUR.—The canopy should come out flat and rest upon the wings.

A MORTIFIED OPERATOR.—We fear that there is no certain remedy for iodide of mercury negatives which have become hard and dense by exposure to light. Mr. Hughes' remedy frequently answers. Try an alcoholic solution of bichloride of mercury, to turn the deposit white again.

IXION.—By applying to Mr. Acklaud, at Horne and Thornthwaite's. 2. Mr. England's stereo pictures are produced by the wet process, described by him in our pages.

Several Correspondents in our next.

Photographs Registered During the Past Week.

MR. JOHN STUART, 120, Buchanan Street, Glasgow,
Two Photographs of Rev. Mr. Turnbull.
Two Photographs of Rev. John H. Thomson.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne,
Photograph—View up Grey Street, Newcastle.
Photograph of St. Thomas's Church.
Photograph of Interior of Central Exchange.
Photograph of Interior of Arcade.
Two Photographs of St. Nicholas' Church.
Photograph of St. Andrew's Church.
Photograph of All Saints' Cemetery.

MR. CHARLES ANTHONY WHEELER, Swindon, Wilts,
Photograph of Male Figure holding Envelope endorsed "The Gout Secret."

MR. J. MAGGETTS, 12, Prospect Place, Kingsland,
Photograph of Rev. E. M. Davis.

MESSRS. J. TAYLOR AND SON, Gold Street, Northamptonshire,
Photograph of John Clare, the Northamptonshire Peasant Poet, with Autograph.

All Communications for the Editor to be addressed to 32, PATERNOSTER ROW.

THE PHOTOGRAPHIC NEWS.

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PINHOLES IN SUMMER.

ONE of the most annoying sources of trouble to the photographer, one from which even the skilled operator has not entire immunity, is the presence of pinholes in his negative. Every photographer knows, moreover, that this annoyance is more prevalent in summer than at other times. Every apparent source of such defect has been eliminated: dust has been carefully removed in the evening, or by a sponge or damp cloth in the morning, to make sure that no floating particles shall be in the camera or operating room; the collodion is allowed to settle, and carefully decanted; the bath and developing solutions are filtered with scrupulous care, and are apparently clear, and in good condition; the plates are perfectly clean, and all traces of dust are removed by a broad camel's-hair tool, just before coating a plate. All these precautions having been taken, the day's work begins well; good negatives, perfectly clean, and free from defects, are secured. But as the day advances and becomes hotter, and the operator becomes busier, as the engagements come in more rapidly, the negatives begin to show some trace of pinholes, which get rapidly worse and worse, until every negative is spoiled with these unsightly blemishes. In desperation, the operator resolves to delay operations five or ten minutes, to filter the bath again. This mends matters for a plate or two; but, very shortly, matters are as bad as ever. If he be a prudent man, he has another bath in reserve, and this is at once put in use, and things look much better; but before the day is over, if he be busy, this bath gets as bad as the first; and worried with rapid press of engagements, a hot atmosphere, and a perplexing difficulty, the operator's health, temper, and pictures all suffer together.

Probably very early the next morning, before the business of the day commences, the offending bath is again tested with a view to its rectification, and the puzzled operator is bewildered to find that it works perfectly. Not a spot or pinhole appears. He is convinced that notwithstanding his precautions, something had been wrong elsewhere; the camera had been dusty, the collodion turbid, or the developer faulty. It is clear the bath is in good condition, and he proceeds hopefully to the next day's business, only to find, however, a repetition on a more provoking scale of the previous day's disasters, and completely puzzled, he is tempted to take refuge in the idea, that it is the work of some of those spiteful elves firmly believed in as the common workers of frolicsome mischief in a less enlightened and more imaginative age.

We remember, some dozen years ago, when the collodion process was still a comparative novelty, a young photographer came to us in a great dilemma; he brought us a negative, with the greatest crop of pinholes which we have ever seen. The day before, he had been getting good results; everything was in the same condition, with the exception of a slight addition he had, on the recommendation of a friend, made to his nitrate bath; this addition was a piece of iodide of potassium. In the earliest days of the collodion process, it was not customary to iodize the nitrate bath; its appetite for iodine was satisfied by the small portions it abstracted from the first few plates immersed. The practice of iodizing the bath to commence with was, if we remember rightly, first introduced by Mr. T. R. Williams, and our young friend had received crude instructions for the operation, which he had immediately put into operation, by putting a piece of iodide of potassium, about the size of a pea, into his bath, and leaving it there. On examining the solution, we found it quite turbid, filled with particles of iodide of silver, infinitely small. Here was the cause of the pinholes very apparent, and we received a more vivid impression as to this cause, as an origin of pinholes, than we could possibly have done from any less malignant case.

Many photographers will readily exclaim, "We are quite familiar with the pinholes arising from an over-iodized bath, and we know how to remove them, but, we are puzzled with those which come in the middle or toward the close of the day, which were not there when we commenced work, and are not there when we commence next morning. If the bath were over-iodized last night, it will be over-iodized this morning, and, if the pinholes arose from this cause yesterday, why are they not present this morning? Like causes must produce like results." We call the especial attention of such readers to the interesting communication of our valued contributor Dr. Vogel in the present number, from which it will be seen that the behaviour of iodide of silver in the nitrate bath is very peculiar, and, unless well understood, somewhat deceptive. A silver solution saturated with iodide and filtered, looking bright and clear, is naturally thought, if in good working condition in all other respects, to be quite satisfactory. A plate is tried, and it is found to be all right, and if, when a dozen plates have been tried, pinholes appear, the operator will not readily attribute them to iodide of silver. But, it is to be observed, that when the bath is *saturated* with iodide of silver to commence with, the abstraction of a grain of silver, or the addition of a drop of water, will destroy the balance; the weaker solution dissolving less iodide than the strong solution. Some operators may have noticed, that after filtering a solution into a bottle, and finding it clear, it has become slightly turbid on pouring it into a new-washed bath, the drops of water clinging to the side of the vessel sufficiently diluting the bath to produce this result. In such a condition every plate which on being excited slightly weakens the bath, brings about a similar condition, and a slight turbidity is soon induced. According to Dr. Vogel's experiments, an increase of temperature acts in a similar manner. It is well-known that various substances are less soluble in warm water than in cold, and iodide of silver is one of

them. It will readily be seen, then, with an increase of temperature in the middle of a hot summer day, with a bath becoming gradually weakened by the excitation of each plate, how a turbid condition is induced which was absent in the morning. It is to be borne in mind, moreover, that the immersion of a number of plates in rapid succession is much more conducive to this result than the immersion of the same number at slow intervals; in the former case the gradually solvent power of the nitrate solution not having time to come into operation. Left at rest for a night, however, and subjected to the necessarily lower temperature, the iodide of silver causing turbidity is re-dissolved, and for a short time the bath works well again.

That the presence of small particles of iodide of silver throughout the solution will cause pinholes, scarcely needs affirming. They are deposited on the collodion film, and sometimes slightly imbedded in the surface from having become attached to the film on the first immersion, and fixed there by the legitimate formation of iodide of silver, and in and on the film all around them. In the first development with iron they are scarcely ever seen; but some of the particles are dislodged in washing the iron solution away, and when the negative is examined in the course of intensification, if this process be conducted before fixing, some of the pinholes are seen, and it is fancied that the pinholes have arisen during the process of intensifying, as, indeed, with an impure silver solution in the pyrogallic solution, they sometimes do. When the fixing solution is applied, it generally happens that all the loose particles, however firmly embedded at first, are removed, and the negative appears in all its provoking fulness of pinholes.

Dr. Vogel's experiments, so often repeated in every-day practice, may be further verified very simply by readers anxious to satisfy themselves. We have repeated some of them. We took in a test-tube a drachm of an old nitrate bath which was quite clear, and working cleanly; to this two minims of distilled water were added, which produced at once a decided turbidity. About ten minims more of the old nitrate bath rendered the solution again clear. The solution was then held before a fire until the temperature arose to about 80° Fah., when the turbidity re-appeared; on cooling, the solution again became perfectly clear. A larger quantity of solution treated in a similar manner, and a plate excited with it whilst turbid, gave abundance of pinholes.

As will be seen from Dr. Vogel's experiments, there are several methods of preserving the iodide of silver in solution, the presence of alcohol, and of nitric acid and acetic acid, all tending in that direction; but it is desirable to avoid all excess of these for other well-known reasons. The best method of avoiding the evils will consist in shunning, as far as possible, the use of an over-iodized bath, avoiding the rapid over-working of a bath, and keeping the solution cool. To effect the latter purpose, a plan to which our attention was recently called by Mr. S. Fry, may be adopted with advantage. It consists in providing a zinc box, in which the glass or porcelain nitrate bath can be placed, a slanting groove being made inside the box, so that the bath may be placed in proper position. In summer this zinc box can be filled with cold water to keep the temperature low, whilst in winter hot water may be used to prevent the temperature falling so low as to check sensitiveness. The use of such an appliance, the use of two baths or more when busy, so as to allow each one intervals of rest between the immersion of plates, and the use of a bath not over-iodized to begin with, will, we believe, save the photographer nine-tenths of the annoyance of this and other kinds that he meets with during the hottest and busiest months. There are, of course, causes of pinholes arising from the collodion, from the developer, from the glass, from dust, and from modes of working, which will require other precautions and other remedies; but there can be little doubt that the cause in question is by far the most prevalent one, and we hope that these suggestions will enable our readers to avoid much of the annoyance which the approach of summer renders imminent.

Since this article was written, we have read an article by the Rev. S. Miller, in *Humphrey's Journal*, bearing out much that we have said. It also will be found in the present number.

THE NEW CARBON PROCESS.

We have one or two additional hints to make with regard to the new carbon process.

Insolubility.—The question as to the cause of spontaneous insolubility still remains open, and demands further investigation. One esteemed contributor suggests that where it occurs it is possible that chondrine has been used instead of gelatine. He says:—"The trouble with the gelatine in Mr. Swan's process: may it not be due to the source of manufacture, in which chondrine is substituted for gelatine? A good deal of gelatine, so-called, is obtained from bones, and is consequently chondrine, which, as I find reason to remember, when, some years ago, I was experimenting upon vehicles in water-colour painting, behaves very differently from gelatine. I think Russian glue is about the best manufactured gelatine in the market, and is obtained, I have little doubt, wholly from skins and tendons, sans bones."

Very little, practically, seems to be known of the distinctions between gelatine and chondrine in chemical constitution, and they appear similar in very general characteristics; the chief difference seems to consist in the latter containing about 2½ per cent. more oxygen, and the same proportion less of nitrogen than gelatine. It is also less soluble in boiling water than gelatine, and is precipitated from its solutions in an insoluble form by some agents, such as acetic acid, acetate of lead and alum, which do not precipitate gelatine. Some of these characteristics would suggest that insolubility would be more readily induced by its use than by the use of gelatine, and that, where it can be distinguished, it should be avoided. In the meantime, there are certain conditions, which it is tolerably certain tend to bring about this spontaneous insolubility which should be known and remembered. The insolubility is of course in all cases the result of a decomposition in the bichromate, and that decomposition is hastened by some causes. In the first place moisture aids it: there is very little chemical action at any time with bodies in a perfectly dry state. It will be observed that thick films of tissue left to dry spontaneously, and therefore requiring a day or two to acquire a state of desiccation which will permit them to be used, will sometimes be found quite insoluble by the time they are ready for printing. Too thick films should therefore be avoided. Heat, which aids chemical action generally, hastens the result; and it will be found insolubility is much more frequently spontaneously induced in summer than in winter. When the tendency to insolubility is present, the application of very hot water at the outset of development will often convert the partial insolubility into total insolubility. The temperature should not exceed 100° F. until all the free bichromate is washed out of the tissue, after which there is less danger in using very hot water if necessary to hasten the operation. Excess of bichromate induces this result: during winter the proportion of bichromate employed with advantage was one-eighth part of a saturated solution of bichromate of ammonia, or, in other words, one drachm, of a 120-grain solution in an ounce of gelatine solution,—the preparation when ready for applying to the plate thus containing fifteen grains of bichromate of ammonia in nine drachms of the gelatine solution. Mr. Swan has recently recommended one-tenth or less, instead of one-eighth of the bichromate solution. Mr. Cooper informs, that recently having been much troubled with insoluble films, he has been gradually reducing the proportion down to one-thirtieth of a saturated solution of bichromate of ammonia,

and that this proportion has given him good results, free from the tendency to spontaneous insolubility. It appears certain that excess of bichromate, thick, slow-drying films, and a moist warm atmosphere, are the most certain causes of insolubility, and that in moist and warm weather a minimum of bichromate and thin films will aid in checking a tendency to this trouble. It is probable that a mode of readily desiccating without the employment of heat, and a means of keeping the tissue dry and not exposed to the atmosphere, will be of great advantage. Mr. Swan is engaged in experiments in this direction, the result of which we shall publish in due time.

Keeping the Tissue.—Closely connected with the accession of spontaneous insolubility is the question of keeping the tissue, as the causes which affect one will affect the other. We may, however, first relate an experience on this subject which illustrates the extent to which keeping properties are dependent upon the proportion of bichromate. Having on one occasion prepared several examples of tissue with slightly varied materials, the results of which we described a fortnight ago, we laid them aside in a dark place, but exposed to the atmosphere at its natural temperature, and on the eighteenth day after the preparation of the films we proceeded to expose three samples. Two were as insoluble as leather, without any exposure; the third was much more sensitive than at first, but developed readily and perfectly in five or ten minutes with water at 100 degrees Fah. What is more remarkable, this was a sample of pigmented gelatine, forwarded to us by Mr. Swan, but in regard to which he observes that the tissue formed by it was very slow indeed in dissolving, even after exceedingly short exposure. The difference in our preparation of it and the others which became insoluble was this: the latter had one-tenth part of saturated solution of bichromate of ammonia, or twelve grains to one ounce and forty-eight minims of gelatine solution (the extra minims being the water in which the bichromate was dissolved), and the tissue, soluble after keeping, having had one-eighth part of a saturated solution of bichromate of potash added. A saturated solution of bichromate of potash containing forty-eight grains to the ounce, this preparation would contain six grains in nine drachms of gelatine solution. Whether any portion of the difference was due to the different base, we cannot state, but it is clear that with this reduced proportion of bichromate a film kept perfectly good for nearly three weeks in circumstances otherwise not favourable for keeping. With the less proportion of bichromate, the sensitiveness is not so great, of course; experience will probably point out the happy medium between a given degree of sensitiveness and a required extent of keeping powers.

Transferring.—Some experiments with the Poitevin-Fargier process have suggested to us a very simple and effective method of transferring Mr. Swan's prints. Instead of allowing the finished print to dry, and then applying paste or other material to attach it to its final resting-place, it is simply necessary to take a piece of albumenized or even plain paper, and place it, face downwards, on the wet gelatinous surface of the print, and rub carefully down. This produces perfect and very firm adhesion, without any trouble; the paper on which it was mounted for development may be easily removed when the print is dry, in the usual way. This method is much simpler, and more effectual, than any method of applying an adhesive material to the gelatine surface of the image, after it has once dried. In the Poitevin-Fargier process, this is the only mode of mounting employed, and we understand that no difficulty on the score of adhesion is experienced.

Fuming Dry Plates.—F. R. Scarlett, of Peshawur, states in the *Bengal Photographic Journal*, that tannin and honey plates, fumed with ammonia before exposure, give him a good negative in forty seconds; the same plates, without the fuming, requiring five minutes' exposure.

MR. WENDEROTH'S METHOD OF TRANSFERRING NEGATIVES.

The following is the method of transferring negatives referred to by Mr. Shadbolt, at the meeting of the London Photographic Society. We condense the details from Mr. Wenderoth's two letters in the *British Journal*.. It may be premised that, as no proportions are given for the strength of the gelatine solution, those used by Mr. Swan, as stated in his article on Transferring, p. 219 of the present volume, may be taken as a guide:—

First. The preparation of the gelatine sheet. Dissolve gelatine or isinglass (gum arabic produces plates more pure even than glass itself, and I would decidedly prefer it if it were not so easily attacked by water, as well as being insufficiently tenacious) at a low heat in water, and do not make it too thin. When dissolved, strain and add to each ounce of this solution *ten drops* of glycerine; mix well and keep warm, or warm again when you want to use it. In my first communication, I recommended the use of honey, but I found that it made the gelatine ferment, whereas the glycerine keeps it sweet and makes it more pliable too.

Take any glass plate, no matter how dirty—but of course *plate glass*—wash it in clean water without using any acids, potash, or alcohol. It does not require any rubbing; and when dry, take a clean piece of linen or cotton cloth and dip it in a *saturated solution of white bees' wax in ether*. Lay the glass horizontally on a clean cloth or paper, and rub the wax all over one side uniformly. Then take another clean cloth and rub all the surplus wax off, leaving a very thin and scarcely perceptible layer of wax on the plate. (The wax is to be dissolved in the ether without heat.) Now coat it with plain collodion. When this is dry, pour the gelatine solution on, and lay it quickly down on a *perfectly horizontal plane*. To become perfectly dry will take from twelve to twenty-four hours. When dry, cut loose around the edges, take it carefully off the glass, and put it away between sheets of paper in *a dry place*, to keep for future use.

These plates might be made advantageously as a distinct branch of industry, and kept for sale in photographic material depôts.

Secondly. Take the negative in the common way on any kind of glass, but do not omit to rub over the side destined to receive the collodion some of the wax solution in sulphuric ether. To apply the gelatine sheet the negative may be dry or still damp.

Thirdly. Immerse the gelatine sheet, for one or two minutes, in a bottle of three parts of alcohol and one part of common water, but be careful to notice which is the collodionized side, as that side should be kept uppermost during the immersion of the sheet. Take some of the alcohol and water bath, and pour it over the collodion of the negative, and drain without leaving too much on it; then lay it down horizontally, and put down on the negative the gelatine film, *collodion side uppermost*, commencing at one end, lowering it by degrees carefully, so that no air gets underneath, when it will be found to attach itself very closely and without blisters, which are obviated by the immersion in the alcohol bath, in which the sheet expands, the small quantity of water dissolving just enough of the gelatine to make it to adhere to the collodion without softening the sheet too much. To dry will take about one hour; but care should be taken not to cut it off before the plate is perfectly dry.

By careful attention to these instructions on failure is possible.

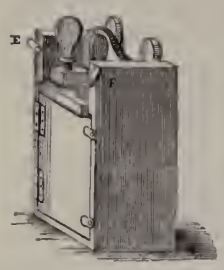
M. SABATIER BLOT'S APPARATUS FOR WORKING IN THE OPEN AIR.

Our esteemed *confrère* M. Lacan, Editor of *La Moniteur de la Photographie*, has favoured us with diagrams and description of apparatus for working photography in the open air with a dark tent, which he conceives to be the best adapted for the purpose hitherto invented. "It consists," M. Lacan states, "of an ordinary camera, a frame holding the glasses, two receptacles placed in two upright compartments of a box, and a little mechanism which can be fixed on to the top of the frame to let down the plate into the solution with greater precision. With these four objects pictures may be taken in the open air with more ease, and even with more certainty, than in a dark room. The receptacles contain, one the nitrate of silver, and the other the protosulphate of iron, and hold enough solution for a day's work. They are filled and closed before departure, so that it is unnecessary to carry bottles, which are always inconvenient on a journey.

"When required for use, the covers of the receptacles are unscrewed, in order to operate; and on removing to another

spot they are again screwed on, and that with the greatest facility. Thus pictures may be taken the whole day without fear of failure, for the operator is sure of what he is about.

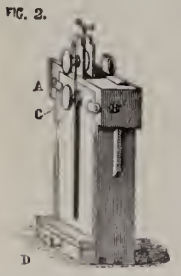
FIG 1



"The *modus operandi* is as follows:—Begin by filling the two receptacles, one with negative bath the other with protosulphate of iron, of the formula below indicated, taking care that the solution does not rise above the line marked near the top of the receptacles. Then the frame is placed upon the nitrate receptacle, and fixed by means of the two little swivels of the stand. The little mechanism is fitted to the top of the frame, the brackets A and B are raised, and the slide facing the operator is taken out of the frame by meaus of the knob C placed on the outside.

"On the inner side of the slide is a little clamp on which the glass is placed, and then screwed to. The plate is pushed out from the slide by means of the knob C; in this position it is collodionized; then, without loss of time, brought back upon the slide, and immediately placed on the frame.

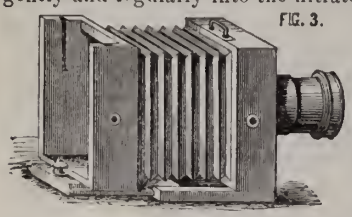
FIG. 2.



"From twenty to thirty seconds should be counted before dipping the plate into the nitrate; but that interval ought not to be exceeded, for fear the plate should lose its sensitiveness in drying.

"The gutter D is opened, and the plate immersed in the nitrate. This is an operation of great delicacy. If the plate be immersed too rapidly, vertical streaks are formed; if there are stoppages, then you have horizontal streaks. The little mechanism on the top of the frame remedies these inconveniences. The hook at the end of the cord is fastened to the knob C, which latter must be unscrewed, and being, in consequence, free, will descend and set the mechanism in motion. Thus the plate will descend gently and regularly into the nitrate.

FIG. 3.



The plate must be left in the nitrate a minute and a half or two minutes. Then, by means of the knob C it must be lifted out of and again dipped into the nitrate of silver, from fifteen to twenty times, and so it is freed from all greasiness. The plate is first lifted half way up the slide to let it drip an instant, and then entirely. You shut the gutter D, into which blotting paper has been previously put, and you let down the plate thereupon, so that the excess of liquid may trickle away. By this means the drops which would have inevitably risen again by capillary attraction, and formed streaks on the plates are absorbed by the blotting-paper. This has also for its object the steadying of the plate and keeping of it in focus. In fact, if the plate were fastened merely at the top, it might shake if the weather grew windy; whereas, by resting on the gutter, it is held at both ends, so does not stir from the focus.

The frame is now detached and applied to the camera, it having been previously ascertained with the half of the ground glass that the object to be reproduced is thoroughly in focus. These arrangements being made, the shutter is opened, and the operation is gone through. Then the case is shut again, and is placed upon the second receptacle, containing the protosulphate of iron. The frame being in position, you open the gutter D, and immerse the glass in the developing solution with the help of the little mechanism already mentioned. It remains in the iron bath about fifteen or twenty seconds, being moved about and lifted out, and then again dipped in. It may now be withdrawn without any fear of the light, and must be washed carefully and put into a box the bottom of which has been lined with blotting paper.

In this way, fifteen or twenty pictures may be done in a day without the nitrate having to be changed or filtered, for the receptacles are large enough to hold the liquid that is necessary for that number. As to the protosulphate of iron: if, after eight or ten pictures, it is found to be weakened, you should throw into it some more strongly-concentrated protosulphate of iron, or merely filter it.

The developing bath used by M. Sabatier Blot is composed of—

Common water	500	parts.
Protosulphate of iron	32	,,
Acetic acid	15	,,
Alcohol	7	,,
Solution of nitrate of silver	15	,,

GLYCERINE FOR KEEPING PLATES MOIST FOR SUBSEQUENT INTENSIFYING.

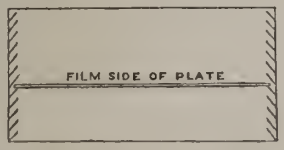
Mr. Coleman Sellers, in an excellent paper on "Photography at Home and Abroad," read before the Philadelphia Photographic Society, has the following remarks on the use of glycerine for preserving negatives taken in the field moist, for intensifying at home:—

Some years ago, when I was one of the champions of wet photography in America, and the fight was going on between Humidus and Siccus, in order to show that much weight of chemicals and what not were not needed to practise the art in the field, I wrote an article for *Humphrey's Journal*, called "Wet Collodion without Water," in which I showed that after a wet collodion plate had been exposed and developed, it could be flowed with a solution of glycerine in water, and put away to wash, fix, and strengthen, if need be, at some future time. I did not want to do without water entirely, but recommended that an ounce or so of water be flowed over the developed picture before applying the glycerine, merely to wash off the spangles of reduced silver. I have, in my collection at home, hundreds of proofs made by those who have availed themselves of this process. Among them I may mention that Mr. Carbutt, of Chicago, last year made an excursion to the headwaters of the Mississippi, and made a great many pictures, all of which he kept moist with glycerine until his return to Chicago, after many weeks' absence, and then found the negative in all respects as if just made. The glycerine will not dry, and yet can be readily washed off to allow of the after processes. A remarkable instance of the power of this substance to keep the plate wet has just come to light. On July 4, 1862, nearly two years ago, a Mr. Denant went to Fairmount to take some views. He was to use the glycerine process. His collodion not being in good order, after a few trials he packed up his traps, and returned home. One negative he had flowed with glycerine. He left his apparatus at the residence of a friend, and not having time to do more in the photography line, the apparatus was eventually sold to a gentleman, who always promised himself the pleasure of using it, but never did so. This negative, with the glycerine on it, came into my possession a few days ago, as I was looking over the apparatus in question, and I immediately cut it in half, one half I flowed with cyanide of potassium in solution without washing, and then washed and dried it. The other half I left as I found it, and now offer it to the consideration of the meeting. It will be seen that it is as wet as if just made, and yet has been in a dry box for nearly two years.

In regard to the use of glycerine, in the manner and for the purpose recommended by me, I would say that it possesses properties admirably adapting it for this use. In the first place, its well-known keeping qualities recommended

it. It is readily soluble in water; it flows evenly over the collodion film; it penetrates that film, and renders it less liable to separate from the glass, and it can be more readily removed by washing, when the plate is to be cleared and dried, than any known substance of similar nature. Sugar, molasses, honey, and all the other sticky substances have been tried, but they all dry and form a crystalline deposit on the plate.

When wet collodion is used for field work, and the plates are to be carried in a moist condition, it is desirable to have the plate-box so made that the films will not be injured by the grooves into which the edges of the plates slide. A very admirable box of this kind has been contrived by my young friend, Mr. James A. Millholland, of Reading, Pennsylvania. He has made all his plans for field work with the use of glycerine in view, and it gives me pleasure this evening to show a box made by him, formed, as you perceive, of sheet tin or tin-plate in all its parts. The grooves are made by a series of thin strips standing at an angle to the sides of the box, and not square with the surface, thus :—



It can be readily seen that plates placed in this box with the glass side next to the edge of the tin strips, can never be injured in the slightest degree. The tin box has a further advantage for the glycerine process, viz., it can be so readily washed out and cleaned, and will not swell up and get out of shape from the action of the moisture. It is proposed in the tents or developing chambers made on the plan of Mr. Carbutt, of Chicago (one of which I hope to exhibit to you at an early day), to have two boxes, each capable of holding twelve plates, one empty, and the other filled with clean plates. As they are used, they are placed in the empty box, which, when full, can be removed from the chamber, and another box put into its place, the clean plate box being also replenished. With a stock of these tin boxes, arranged in any convenient wooden box, any number of plates may be brought home wet and finished at leisure. Mr. Carbutt, as I have before said, is in the habit of making very long journeys, and bringing his plates home wet, and he assures me that he has never lost a picture from that cause. In conclusion, I would recommend those who think of using wet collodions for field work to try the glycerine plan, and by so doing they will simplify their stock of chemicals, and be enabled to do more work in less time.

IODIZING THE NEGATIVE BATH.

BY S. MILLER.*

Iodizing the nitrate of silver bath is considered so very simple a thing, that but little attention is paid to it. The rule laid down, to add as much iodide of silver as the bath can dissolve, is generally followed, and when the excess is filtered out all is considered to be right. A series of experiments has convinced me that this is a mistake; that a grave error is underlying it, which is the source of many, if not most, of the perplexing difficulties experienced in the subsequent management of the bath. It is a fruitful source of the pinholes, of which there is so much complaint made. I will endeavour to make the subject plain by referring to a few facts, and point out the remedy.

1. The capacity of a nitrate of silver solution to dissolve and keep in solution iodide of silver is in proportion to its strength. This is nothing new; but it may have escaped the attention of many operators, what the proposition really implies, and what it does not imply. It implies, that an ounce of silver dissolved, for instance, in six ounces of water, will dissolve twice as much iodine as the same quantity of silver will take up when dissolved in twelve ounces of water. Hence, if the six ounces of solution is saturated with iodine and filtered perfectly clear, and six ounces more of water is added, one half of the iodine is set free; and yet, when this is filtered out, the bath still remains as fully *saturated* with iodine as it had been before, with the same liability to set iodine free on the addition of water, or on dilution by the abstraction of silver in using the bath. The following additional facts will confirm this.

2. Pour into the graduator an ounce of silver solution which has been iodized to its full capacity; no matter how strong the solution is. Then add a few drops of water. The result is that iodine is set free and the solution becomes turbid. Its capacity to hold iodine in solution is weakened in proportion to the dilution caused by the addition of water.

3. The same result follows, to a greater or less extent, when the bath, after filtering, is poured into the bath-holder immediately after washing. The drops of water adhering to the sides and bottom is enough to set iodine free in the proportion in which the bath has been diluted. It may be but little, but enough to give constant annoyance to the operator.

4. The same result follows when the bath becomes diluted by the abstraction of silver. Each plate that is inserted in the bath abstracts silver and weakens its capacity to hold iodine in solution. In using a fully iodized bath, therefore, iodine is constantly being set free until the bath becomes turbid, and then filtering is resorted to; but all the filtering in the world will not cure it of its liability to play the same trick over and over again, to the perpetual annoyance of the operator.

5. Our original proposition does not imply, as already intimated, that the strength or weakness of the bath, in itself considered, has anything to do with these troubles. The same difficulty is experienced with a 50 or a 30 grain bath if iodized to its full capacity. The cause of all this difficulty lies in the simple fact, that a bath fully saturated with iodine cannot allow any dilution either by the addition of water or abstraction of silver, without setting free a corresponding proportion of iodine.

6. Very different is the result when the bath is iodized as follows: Suppose you dissolve four ounces of silver in forty-eight ounces of water, more or less. Pour six ounces of this solution into a separate bottle, and saturate the rest with iodine in the usual way; then filter out all the undissolved iodine, and add to it the six ounces of uniodized solution. The bath thus prepared from the start is not fully iodized, and hence can bear the incidental dilution caused by the using of it, without setting iodine free. A few drops of water added to an ounce of this solution will not make it turbid as in the former case; the water adhering to the sides and bottom of the bath-holder will not give any difficulty, and the abstraction of silver by use will not oblige you to filter it every few hours to get rid of its free iodine, as no iodine is set free as long as it does not become saturated with iodine. When, in course of time, it does become saturated, the remedy is to restore it to what it was originally. This can be done by adding pure crystals of nitrate of silver, or by adding a quantity of uniodized silver solution. A bath thus treated will not be liable to produce the difficulties above referred to, and one of the principal causes of pinholes and other troubles is avoided.

I would yet add that, in redeveloping with silver, care should be taken not to use the iodized solution of the bath for the purpose, as is often the case. In diluting it with water, iodine is set free, which, when poured over the negative, is liable to produce pinholes in the process of redeveloping. A pure silver solution should be used for this purpose.

* *Humphrey's Journal.*

THE CONDITIONS REQUIRED IN ORDER TO PRODUCE A UNIFORM, UNCLOUDED, AND UNBLOTTED BACKGROUND ON A NEGATIVE.

BEING SHORT LESSON IN PHOTOGRAPHY.—No. 24.*

THE consideration of such conditions seldom enters the mind of the ordinary operator, because he generally supposes the background will take care of itself, if it happens only to be of the *right* colour. This is, after all, not an unnatural conception for the inexperienced.

As, however, the artist advances step by step in success he will finally discover that the posing of the sitter has a definite connection with the position, colour, and illumination of the screen on which the picture of the model is to be projected.

There is a variety of backgrounds which may be comprehended under the three denominations of Uniform, Graduated, and Pictorial.

By Uniform backgrounds are understood all those which are monochromatic, and are intended to produce a uniform tint of equal intensity in the negative behind the sitter.

Graduated backgrounds are prepared of one tint, it is true, but shaded off in certain directions at the option of the artist.

Whilst Pictorial backgrounds represent architecture, landscape, domestic, or naval scenery in accordance with the requirements of special cases. Such backgrounds are monochromatic, but shaded and in true perspective.

Now the background may be quite uniform itself, and yet the operator may probably seldom succeed in producing a uniform background in his negative. Besides this, it frequently happens that the picture appears to be *inlaid* in the background and not standing out, as it were, in front of it.

The conditions, then, required in order to produce uniformity of tint and at the same time *relief* in the picture appear to be those requiring essential consideration.

The gradations of colour between white and black as extremes on the collodion film are produced by the actinic action of various colours. If the positive print is destined to have a white background, the artist knows that all white drapery, linen, &c., is reproduced in white; therefore, the background must be white, and not only must it be white, but the surface must be homogeneous, free from undulations, streaks, fibrous texture, in fact, it is better to prepare the surface with a layer of homogeneous fine pulverulent water paint, than to depend upon the woven material of the loom. Still all inequalities of meshes or texture, &c., can easily be overcome by giving the background motion during the time the picture is being impressed on the collodion. If the background be mottled with spots of whatever kind, it is impossible to produce a negative background without them; therefore, be careful not to besmear the background with spots of dirty water from wet fingers or from other sources. Be equally careful not to place the background in such a position as to receive the drops of rain as they fall from the skylight, which frequently are impregnated either with lead or iron, and thus produce iron moulds or lead marks on the screens.

This trouble being obviated, or care having been taken not to superinduce it, we next observe another frequent, very frequent trouble—this is the manifestation of unequal shades in different parts of the negative produced by the background. To what are these shades owing?

To several causes.

Place the model in front of the background, near to it, and using a side front, or very low skylight, you will observe a shadow of the sitter himself projected on the background, of which some parts will be visible in the picture; besides this, on a more minute examination, it will be ascertained, under the conditions here enumerated, that the upper part of the background is in the *shade*, is *dark*, whilst the lower part is quite *light;* thus, then, are visible the shadows of the sitter and the shade of the upper part of the background.

We have no right to hope that the negative will be free from these offensive shades; they will certainly be reproduced. In addition to these, from the fact that the background is so near the sitter, the image will be nearly on the same plane and suffused with the same light, and will thus produce, or have a tendency to produce, a *flat* picture. How are these evils to be remedied?

In the first place, move the screen farther back from the sitter, so that a certain relief may be produced in the picture, by a difference of distance from the lens, and a different intensity of illumination; for if the background be equally bright with light, we make it a principal object in the picture, which is never or seldom the intention of the artist; it is in general very bad taste to do so.

By taking this step, most likely the shadows on the top are considerably increased; and, in addition, others are produced on the sides. It may happen, however, that the shadow of the sitter himself has been entirely removed; if not, both this and the preceding demand the artist's attention to remove. To remove!—what? a shadow?—a shadow is the absence of light—is a negative expression—is nothing, or represents the want of something. This something, which is required to fill up the vacuum, is light. To remove a shadow is a misnomer; but we won't quarrel with terms; let us devise means to remove the troublesome shadows.

A sensible way, and a very simple way, is to have the skylights and side-lights so arranged as to allow a thin slit of light to be opened, when required, upon the upper part and on the sides of the background. If the roof of the glass-house is not so constructed for the special illumination of the background, then we must do the next best. This consists in placing a horizontal curtain of black or blue cloth high above the sitter, on a level with the ceiling, so as to leave a narrow slit between the curtain and the ceiling. By this means a small quantity of light gets behind the curtain and illumines the upper part of the background to a small extent, whilst the curtain itself diminishes the quantity of light on the lower part, and thus the light becomes equalized, or may become equalized in a great measure over the background. The same expedient is to be employed by means of vertical screens or curtains so as to modulate the shades on the sides.

By this time the artist must surely comprehend the task to be performed; and, knowing this, the labour is half performed. It is useless, it is a waste of time, to move curtains, to fix screens at haphazard; an object must always be in view. May we ask, what the object is? what it has been?

Simply *to let in light* in one place, and to *obstruct light* in another place, in order to render the illumination on a given surface uniform in intensity but still *less intense* than the illumination of the sitter.

It will, no doubt, frequently happen that the expedients, thus enumerated, will not be built effective, in which case curtains and screens will have to be inclined in such a position as to reflect light upon the shaded parts.

Let an inverted ┐ represent the background, of which the upper part is in shade, and the background is so far back that the light from the skylight cannot possibly reach it; in this case a curtain can be fixed at an angle of 45° with the ceiling. We do not mean to say that this angle is always to be preserved, but simply to show that light can thus be sent into corners where before it was dark. It is the duty of the photographic artist to study the properties of light in reference to reflection and refraction especially, in order that he may know how to handle the tools of his handicraft, if we may so use the expressions. For by a knowledge of the reflection of light he can arrange his model, the background, and the accessories with artistic skill; and with a knowledge of refraction he can learn to estimate the worth, the adaptability, and modification of his lenses.

By arrangements, thus indicated, uniformity of tint can be attained. The white background is used generally where no tint whatever is required, where the picture is to appear on white paper as the background. The colour of the background which seems to be more universally in use than any other, is a sort of drab. A gray or a blue background will produce much the same effect on the negative.

In vignette printing an artificial tint is produced as a background after the image has been printed, by covering the portrait with an opaque oval of the proper size, and then by exposing the remaining part of the sensitized paper to the action of light for the desired or required time. This mode of printing-in a background produces sometimes a very pleasing effect.

Graduated backgrounds, or backgrounds which are to produce gradation of tint on the negatives, may be got up in two ways: the one consists in communicating to the ordinary background a gradation of tint by an artistic management of the light, which can easily be effected in those cases where a set of lights are constructed solely for the illumination of the back-

* From *Humphrey's Journal.*

ground. This mode of arrangement presupposes more optical skill than most photographers possess, and thus is seldom carried out.

The second mode, therefore, is the one in common use; it consists in having a background already fixed up with the artistic gradations, which requires only to be placed in the position of uniform background for immediate use.

Pictorial backgrounds can be purchased in the city of any size, shape, colour, or subject. Where such are introduced in a gallery, a variety is required, otherwise absurdities will be committed which would tend to render the artist's operations ludicrous; for the same habiliments do not suit all complexions, the same tools are not used by all artisans, nor is the same scenery, whatever it may be, adapted for all sitters.

To sum up the instruction: be sure that the background itself is *uniform in tint, unclouded by shadows*, and *unblotted by careless manipulations;* then it may be hoped, and only then, that the negative itself will be the reproduction of that which is required.

Observe, then, that the background must be at some distance (three or four feet) behind the model, and illuminated to a less intensity in order to make the sitter into the principal object by the consequent production of relief.

THE BEHAVIOUR OF IODIDE OF SILVER IN THE SILVER BATH.

BY DR. HERMANN VOGEL.

A FACT known to every photographer is, that iodide of silver is dissolved in the silver bath, and is precipitated wholly or partly, when the latter is diluted. This, in fact, is the reason that photographic plates are affected by a new silver bath.

But, till now, nobody has examined the photographic influence of the dissolved iodide of silver or fixed its quantity. For this purpose I composed a saturated solution of iodide of silver in nitrate of silver, mixing to 50 cubic centimetres of a solution of the latter, containing in 84 cubic centimetres 10 grammes of the salt, 2¼ cubic centimetres of a solution of iodide of potassium of 1 per cent., by which was formed a precipitation of iodide of silver, which was dissolved again by briskly agitating the bottle.

This solution of nitrate of silver was not saturated totally by the iodide, for, by adding a little quantity of water it became turbid, and cleared up again on being agitated. It was not until I added 14 parts of water to 100 parts of the solution, that the turbidity became permanent. This solution, saturated by dilution, behaved rather singularly. It became turbid by warming it, even by holding it in the warm hand, and cleared up by putting it in water of about 5° C. So, by warming and cooling it alternately, I could make it turbid and clear as I liked. The change of the state was but slow, and finished in about five minutes. The bath not diluted could be made turbid only by heating it to near the boiling point.

From these observations, it follows evidently that *iodide of silver is less soluble in a warm solution of nitrate of silver than in a cold one*, like some other substances, as *e. g.* carbonate of lime, sulphates of lime and soda, which are dissolved in a greater quantity in cold water than in hot water. This fact also explains a phenomenon sometimes seen in photography. In summer time often the silver bath will become turbid, and after some time clear up, and this turbidity will return even when the bath is filtered with great care, especially when a greater number of plates are silvered in it in a short time. The reason of this is simply that the silver bath has become warm, and, therefore, cannot dissolve the same quantity of iodide of silver as before. Of course an older bath, more saturated with iodide of silver, will show these changes of state in a higher degree. Therefore, observe this rule: keep your silver bath cool in summer time. Practically, this rule is recommended already by Disderi, and in the same way Mr. Brann, of Dornach, when travelling, keeps the silver bath in a box filled with cold water. The best temperature to be maintained will be 12 to 15° C.; for a lower temperature will make the bath of a very low sensitizing power.

Naturally, a silver bath, totally saturated by iodide of silver, can only be made clear by adding a quantity of fresh solution of silver.

But there is still another substance entering into the silver bath, which is of great influence on its dissolving capacity. This is alcohol.

The solution saturated with iodide of silver, before mentioned, which became cloudy by adding but one drop of water, could be mixed with one-third of its first volume of alcohol at 16° C. = 60° F., and with one-half volume at 50° F., without permanent turbidity. Therefore, in a solution of silver containing alcohol, the iodide of silver is soluble in a higher degree than solutions which do not contain it. Again, a saturated solution with alcohol, behaves like a solution without it; it gets turbid by warming it with the hand, and is cleared by cooling it.

Now, every silver bath contains a quantity of alcohol, which it acquires from collodionized plates, and which will increase the power of dissolving iodide of silver; but it would not be advantageous to add a greater quantity of alcohol, for this easily may contain some other organic substances, which will produce a decomposition of the silver bath, or at least diminish the sensibility and intensity of the plates made in the latter. Other substances which are very often in the silver bath behave in like manner: *e. g.* acetic acid, ether, nitric acid. The saturated solution of iodide of silver, in the bath before mentioned, could be mixed with half of its first volume of acetic acid, and with one volume of nitric acid, before permanent turbidity arose. A turbid bath became clear, after mixing it with nitric acid. Therefore the nitric acid favours, in the highest manner, the solubility of the iodide of silver in the silver bath.

(To be continued.)

ENLARGED POSITIVES ON ARTIST'S CANVAS.

BY M. CH. WALDACK.

§ 1. SELECT a very smooth piece of canvas, covered with a thick coating of white lead, old enough to have acquired a certain hardness. This canvas extended upon a square frame must be cleaned, so that an aqueous liquid will adhere to the entire surface, instead of in drops, as upon a greasy substance, or in other terms, it must retain water. This result is obtained either by washing the surface with soap-water containing a small quantity of alkali or cyanide of potassium, or in rubbing it with a piece of rag moistened with alcohol.

§ 2. This done, apply the following solution to its surface by means of a large flat brush or pencil:—

Distilled water	1,000 parts
Gelatine	15 „
Iodide of potassium	10 „
Bromide of potassium	5 „

The gelatine must be softened in water during one or two hours, after which the application of a gentle heat will cause it to dissolve.

This solution is applied warm: it becomes a jelly when cold. The canvas is covered with this solution in a room heated to such a temperature that the coating will become dry without first setting. We can easily perceive when this result is attained, for if the coating sets first, it dries irregularly, forming lines and veins.

§ 3. The second operation is the sensitizing. It is effected by means of the following solution:—

Distilled water	1,000 parts
Nitrate of silver	50 „
Iodide of potassium	0·6 „
Ordinary acetic acid	100 „

This solution is prepared in the same manner as that em-

ployed in the collodion process, but it must be poured over the canvas. To perform this operation without producing irregularities or spots, remove the canvas from the frame upon which it is stretched, and put it upon a wooden frame upon which a tube of caoutchouc is glued or nailed.

The edges of the canvas rest upon the caoutchouc. By means of four, six, or eight wooden screws, the canvas is fastened to the frame so as to produce a dish, of which it forms the bottom.

§ 4. The wooden frame is covered with several coatings of lac spirit varnish, so as to render it impervious. The caoutchouc tube is at first washed with soap-water, then covered with a coat of wax, by passing over it a mixture of two parts of white wax and one of turpentine. The object of this precaution is to avoid a reaction between the nitrate of silver and the sulphur which exists in the vulcanized caoutchouc. The tube is placed in a groove, and may be fastened by means of silver or blackened pins.

§ 5. To sensitize the canvas raise the dish on one side, as in sensitizing collodiou plates, and pour into the lower part a sufficient quantity of the nitrate of silver solution, then cause it to flow over the whole surface by making the dish resume its horizontal position. Let contact be prolonged for about a minute, keeping the frame constantly in motion, after which, pour off the nitrate solution into a bottle. This solution must be employed only once, and care must be taken to employ only sufficient quantity to sensitize each canvas.

§ 6. The focussing is made upon the canvas before sensitizing.

The exposure to light is effected by means of the solar camera; the time of exposure will depend upon so many different circumstances, that it is impossible to state it absolutely. In our practice it has varied from thirty seconds to five minutes. The picture is slightly visible before development, and the more so in proportion to the strength of contrast in the negative.

§ 7. Development is performed with a solution one fourth saturated, of gallic acid, to which a few drops of acetic acid are added. It must be effected as rapidly as the iron development in the collodion process. The solution of nitrate, which during the exposure has drained into the lower part of the dish, is put into a bottle, then the developer is projected over the canvas, care being taken to cover it at a single dash. This is performed in the same manner as the sensitizing.

§ 8. The solution of gallic acid must act like the pyrogallic in the collodion process. If it blackens rapidly, and before the picture has completely appeared, it shows that the silver solution contains organic matters, or that it has been in contact with the caouchouc tube.

To avoid the whites becoming tarnished, by protracted developing, we stop the latter by pouring a very weak solution of common salt upon the picture. It is then washed in several waters, removed from the frame, and fixed by hyposulphite of soda, of the usual strength. The final washing to remove the hyposulphite may be performed in five or six minutes.

§ 9. The picture must not be fixed while it is in the frame, for this must be washed with very great care, before being again employed.

§ 10. The frame is cleaned with soap water and a little cyanide of potassium, then washed in plenty of water.

The nitrate of silver employed blackens in the course of a few hours, and it is impossible to purify it by filtering through kaolin or chloride of silver. It is therefore best to precipitate the silver in the state of chloride or evaporate the solution to dryness, and heat it to destroy the organic matters.

When the solution is mixed with chloride of silver immediately after it has been employed, and before it has had time to become discoloured the colouring does not take place, and it may be employed again.

§ 11. The canvas when dry may be put into the hands of the painter without any further preparation.

Some photographers employ white of egg instead of gelatine. The white of egg produces a glossy coating over which the pencil glides so easily, and which sometimes scales off after the picture is paintep upon it. Gelatine, on the contrary, forms a coating of a *mat* aspect, and so adherent that it seems to form part of the canvas itself.—*Repertoire Encyclopœdique de Photographie.*

Proceedings of Societies.

LONDON PHOTOGRAPHIC SOCIETY.

THE last meeting of the present session was held at King's College on the evening of Tuesday the 7th inst., Mr. GLAISHER, F.R.S., in the chair.

The minutes of a previous meeting were read and confirmed, and the following members were elected: Mrs. Julia Margaret Cameron, and the Rev. T. M. Raven.

The CHAIRMAN called attention to some portraits taken by Mr. Brothers of Manchester, by the aid of the magnesium light. The first was described as Professor Faraday; he had known him very many years, but must confess he could discover no likeness whatever to him in this picture. The second was described as Professor Roscoe, and in point of likeness, it seemed to him to be just as faulty. The third was Sir H. Holland. He would be glad to learn if any of the members could detect any likeness in the pictures.

The CHAIRMAN read a letter received from the Prince of Wales regretting his inability, and that of the Princess, from other engagements, of visiting the photographic exhibition, previous to its public opening; and thanking the society for the invitation. The chairman took occasion to remind members that the exhibition was open in Pall Mall, and that each member would have the privilege of admission with a friend, on signing their name at the entrance.

The CHAIRMAN called attention to some photographs by M. Rousseau of Valparaiso.

The SECRETARY read a letter from Mr. Ross, referring to a correspondence between Mr. Sutton and Mr. Baynham Jones, in which he stated the latter had expressed doubts as to the working of the curved-fronted camera. He had therefore sent a camera and a print for the inspection of members.

The CHAIRMAN said the society was not in a position to discuss the merits of any camera. The *Journal* would be doubtless open to a reply to any statement made in it, and the society was always glad to receive suggestions and information, but Mr. Ross must be content to have the picture examined without entering into any discussion of the matter. The picture and camera might be placed on the table, and members might form their own conclusions.

Mr. UNDERWOOD thought it was an advantage for members to have an opportunity of seeing the camera.

The CHAIRMAN agreed with him, and they were, of course, obliged to Mr. Ross; but the society must not attempt, as a society, to express an opinion on the productions of individuals. They must in all things hold an even balance, and the subject had therefore better not be discussed.

Mr. HART then exhibited and described a little apparatus he had contrived for burning the magnesium wire, and called attention to the fact, that the light arrested the attention of a baby for a time long enough to secure a portrait.

Mr. UNDERWOOD asked what was the difference between this and the oxyhydrogen light.

Mr. HART stated that this was more actinic, and that magnesium ignited at a much lower temperature than calcium.

After some remarks on the advantage of this light, and a vote of thanks,

Mr. SHADBOLT exhibited some transferred negatives, removed from the glass by a process analogous to Mr. Swan's, by Mr. Wenderoth, of Philadelphia, who had for some time practised the method without any knowledge of Mr. Swan's proceedings. Mr. Wenderoth, he thought, had so perfected the process, as to make it quite safe. The full details had been published in the last number of the *British Journal*. He commenced by rubbing a roughly cleaned plate of glass, with a saturated solution of white wax in sulphuric ether; this, when rubbed off with a clean cloth, left a scarcely perceptible layer of wax on the glass, which was sufficient, however,

to ensure the film coming perfectly away in the process of transferring. The negative was then taken in the usual way. In transferring, Mr. Wenderoth used a tissue made somewhat in the same manner as Mr. Swan's, but without bichromate or colouring matter. This tissue was placed upon the moistened negative, and pressed down. When dry, the negative might be removed from the glass, and would consist of a film of collodion containing the image, a film of flexible gelatine, and another film of collodion, effectually protecting the film of gelatine from moisture.* The examples he he now exhibited, had crossed the Atlantic, and withstood a little rough usage—one of them had been bent double—without injury. He might further add on the question of probable permanency, that in the small earthenware vessel he now produced, was a piece of a mixture of gelatine and glycerine prepared by himself fourteen years ago, for mounting microscopic objects. This was still perfect and quite flexible. not having decomposed, or exhibited any fungoid growth in any degree. It was possible he might have used creosote water in dissolving the gelatine, but he was uncertain. The permanency of this material afforded a fair guarantee of the permanency of the transferred negatives.

[The preparation exhibited was a clear flexible cake, about a quarter of an inch thick. It probably had been prepared with creosote water, as, although it has no odour of creosote, yet on touching it with the tongue, it has a slightly burning acrid taste, not belonging to either gelatine or glycerine.]

Mr. Shadbolt, in acknowledging a vote of thanks, referred to the fact that where it was necessary to produce one print from several negatives these transferred films could be easily so joined as to do the work at one operation, instead of several, as was now necessary.

Mr. Sydney Smyth then proceeded to manipulate with the solar camera, and produced a very good picture with the magnesium light.

The Chairman, after some observations on the success of the experiment and its importance, proposed a vote of thanks to Mr. Smyth, and asked if any gentleman had any observations to make on the experiment.

Mr. Wharton Simpson said he had just elicited from Mr. Smyth that the amount of wire burnt to obtain sufficient light for the picture was about twelve grains, measuring in length about twelve inches. This statement of the amount required to produce sufficient light would probably interest members.

Mr. Smith was assisted by Mr. Percy Bachoffner, one of whose solar camera pictures, together with some of Mr. Smyth's, were exhibited and admired during the evening.

The Chairman, in announcing that this was the last meeting of the session, expressed a hope that the results of the labours of many of the members would be exhibited when they met again. He also again reminded them that the Photographic Exhibition was open at 48, Pall Mall, and hoped members and their paying friends would visit it.

The meeting then adjourned.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 8th June, 1864.

In the new Spanish photographic journal, *El Eco de la Fotografia*, a process is given for obtaining portraits on a double ground, with inscriptions, in three colours; it is as follows:—A negative is placed with a sheet of sensitized paper in the printing frame, and on the glass of the frame a piece of stout cardboard, in which an oval is cut and covered with parchment paper; above this piece of cardboard a second is placed, much thicker, having also an oval, a little smaller than the first, and also covered with parchment paper.

At least two positives must be printed; from one remove the face, neck, and other parts which must remain white; on the other, print the background, which will have to be obtained by means of a second negative, according to the method of copying engraving, by taking great care to exactly cover the bust already printed, and the other parts which must come white. The inscriptions are obtained in the same way.

Upon a glass plate, whiter and more transparent than the proof, we print the inscription and details of the background, which must appear white. This inscription on the glass plate is made by engraving or drawing with a pen upon a lithographic stone; some proofs are taken upon very thin tough paper, which is slightly moistened at the back, on the lithographed part, and placed on one of the sides of the glass plate well cleaned; it is then gently pressed, and after moistening the paper a little more, it is removed, the ink remains adherent to the glass plate, and is left to dry.

This operation may be performed in an easier and quicker manner by taking parchment paper of very uniform texture, transparent and free from grain, upon which we draw in very thick India ink.

Upon the glass or parchment paper, thus prepared, glue the profile of the bust at the proper place, and, thus prepared, place upon it a printed proof, in such manner that all the details of the portrait, the background, and inscription are suitably arranged; the whole is placed in a printing frame, the glass of which is screened with a piece of velvet-black paper in double folds. All these operations are made in a dark room, lighted by a weak yellow light.

Everything being thus arranged, the frame is put into the sun-light, uncovered, and exposed, more or less, according to the intensity desired, and which may vary from a light grey to a deep black.

For grey letters, two glasses, or two sheets of parchment paper, are prepared, bearing the same inscriptions, background, and silhouette, but the one, No. 1, will remain intact, while from the other, No. 2, the letters and the parts of the background, which must come grey, will be removed.

If the general ground requires ten seconds' exposure to attain the desired tone, the proof will be exposed five seconds to the sun, with the glass No. 1, and five more seconds with the glass No. 2. We shall, in this way, obtain the three kinds of letters, and the three tints in the background, after which, the toning, fixing, and washing are performed in the usual manner.

In *Le Moniteur de la Photographie* M. Lacan has the following remarks upon the Paris Photographic Exhibition. He says: "among the photographic works now exhibiting at the *Palais de l' Industrie*, those competing for the De Luynes' prize, deserve special attention. They are not only interesting and important productions, but they also show to what point photography has reached in the definite path which its progress marked out for it. It is very evident to all those who have followed, since its origin, the beautiful discovery of Niepce, Daguerre and Talbot, that the process of printing with salts of silver, as perfect as it has become, is only a transitory practical means, destined to be not only modified, but even abandoned for a method of printing more complete and more comformable to the printing process, at least for what concerns the great majority of applications of photography.

The active researches undertaken up to the present day, have resulted in various discoveries, such as heliographic engraving, photolithography, carbon printing, enamel photography, which, however, may all be summed up in two great methods—photography on metal, and photography on stone—for the others are, it may be said, only different applications of the same principle; and I am persuaded that all those who have studied the subject, will agree with me if I add, that the perfection of the proofs upon paper by Mr. Swan, and the photographic enamels of M. Lafon de Camarsac, leave no doubt as to the possibility of soon obtaining on the same principles, and nearly with the same substances, lithographs and engraved plates nearly, if not quite, as perfect. The photolithographs by M. Lemercier, by M.

* We give an extract from Mr. Wenderoth's letter with more details on another page.

Poitevin's process, whatever their dimensions, reproduce all the qualities of the negative; what little defects they exhibit will disappear with more practice and experience.

Some proofs exhibited by M. Morvan, when compared with examples from the same negatives, taken by the ordinary processes, and placed side by side with them, exhibit the same finish and delicacy, harmony of tone and half-tone, which we admire in the best proofs taken with salts of silver.

If, on the other hand, we examine the beautiful heliographic plates by M. Charles Nègre, and certain reproductions of a bas-relief exhibited by M. Garnier, we shall be compelled to recognize that photographic engraving really exists; and that if, instead of remaining in the hands of one or two experimentalists, it becomes perfected by practice, we shall not require to seek new methods; retouching, as much as it is now necessary, will quickly become superfluous, and the process simplified by experience, will soon adapt itself to the wants of industry, which finds it too expensive at present.

Mr. Placet's method, we are persuaded, combines the best elements of those hitherto published, and will ultimately yield the best results. The two plates he now exhibits are of very delicate execution. M. Pouncy exhibits some proofs obtained in printing ink, which, although satisfactory as experiments, still leave much to be desired.

M. Pretsch does not appear to have made any material progress. Messrs. Simoneau and Toovey have had the idea of applying photographic pictures upon wood, which thus form a new kind of decoration in furniture. As for M. Regnault, who employs benzoin and rosin as a coating, and alcohol and water for a solvent, and thus obtains engraved metallic plates, the aspect of which reminds us of M. Fizeau's first experiments, we recommend him to follow the suggestions of MM. Niepce and Poitevin, which, in many operators' hands, give very superior results.

As to the photographic enamels by M. Lafon de Camarsac, it is impossible to imagine anything of the kind more perfect. M. Poitevin, among other of his numerous processes, exhibits some very curious pictures on porcelain, but they are not among the best he has obtained, and in this particular he has done neither himself nor his process justice.

M. Verneuil, of Boulogne, having purchased one of M. Liebert's enlarging apparatus, writes to the editor of *Le Moniteur*, that he is delighted with the results obtained by it, and feels it his duty to inform his brother photographers of its superiority over all other apparatus of the kind. He obtains proofs eighteen by twenty-four inches on albumen-chloride paper in fifty-five minutes' exposure; tones them in chloride of gold and acetate of soda, and fixes them in hyposulphite of soda. The great excellence of the apparatus consists in its yielding pictures free from distortion, and its great economy, together with facility of working.

PERMANGANATE OF POTASH A TEST FOR HYPO.

Sir,—A correspondent of yours has opened a fearful battery of chemical notation upon my letter; but he must have read that letter very superficially:—

He has detailed with much precision four experiments—each proving that organic matter, in whatever form, converts the violet colour of permanganate into a "light red." He therefore concludes that I must be wrong in my statement, that the presence of hyposulphite of soda is shown by the colour of the permanganate being changed into "yellow," varying in intensity from a muddy yellow to that of pale sherry, and even to absence of all colour, according to the proportion of hyposulphite present. Before reading his letter, I had repeated my former experiments on the subject, and here send you the results. They have convinced me that "H. G. M."* was right in stating that permanganate of potash is a test of the presence of hyposulphite of soda.

In the following experiments, the proportions used were 1 ounce of liquid, 10 minims of permanganate of potash, and 2 minims of sulphuric acid.

No. 1. Water in which prints had been steeped for several hours without change. The mixture became at once transparent and subsequently cloudy, depositing a light yellow sediment.

No. 2. Water in which 5 or 6 large prints had been steeped for 12 hours. This water had been continuously changed, a small current from the tap flowing, throughout, to the bottom, and over the edge, of the vessel in which the prints were floating.

In a few hours it became *yellow*.

(This is the same cistern water to which I referred in my former letter, and which is so impure, that it would have produced a muddy *brick colour*, had there been no controlling substance combined with it.)

No. 3. Distilled water with some chemically pure blotting paper. A delicate light red was produced.

No. 4. Distilled water, and a small piece of the same pure blotting paper, but which had received the dripping of a well-washed print—it was dry when used—the result was a delicate *yellow*, about the colour of pale sherry.

No. 5. Add to distilled water a drachm of weak hyposulphite solution. It became at once transparent.

No. 6. Empty the measuring glass which contained No. 5, and held it reversed until the last drop had fallen from it. Put in distilled water (with the permanganate as above). It became transparent immediately.

The inference I draw is, that organic matter, or impurity of any kind in water, changes the violet colour of the permanganate to *red*, varying from a muddy brick dust to a delicate light *red*. While, if the smallest quantity of hyposulphite of soda be present, the violet of the permanganate is changed into a *yellow* colour, varying in intensity (even to absence of colour), according to the quantity of hyposulphite present.—I have the honour to be, sir, your obedient servant, N.

June 5th, 1864.

* In No. 214 of the *Journal of Photography*, page 179.

BLURRING OF THE IMAGE ON TANNIN PLATES.

Dear Sir,—In your "Answers to Correspondents" last week, one headed "Tauniu Process" will not, I fear, entirely meet the difficulty. I never stated that more bromide in bromo-iodized collodion would diminish the tendency to blurring, but that simply bromized collodion was not so liable to it. I have no doubt that Mr. Sutton's explanation of the cause of the fault in question is the true one, that it is produced by the reflection of light which has passed through the film from the back surface of the glass. This view explains the principal phenomena which I have observed in reference to the question. The length of exposure which will produce the fault will, of course, depend greatly on the opacity of the film to chemical light; therefore, dry collodion is worse in this respect than wet, because the former becomes more transparent in drying. Increasing the proportion of bromide in bromo-iodized collodion diminishes the opacity of the film unless the plate is kept a long time in the bath, so it may increase the evil. I have found bromized better than bromo-iodized, because I have used samples which produced a more creamy film. A weak solution of tannin is better than a strong one, because the latter renders the collodion much more transparent when dried on the film; when washed off I have observed the same difference.—Yours truly,

7th June, 1864. C. Russell.

[We fear that Mr. Sutton's ingenious explanation of the cause of blurring, which Major Russell here adopts, will scarcely meet the case, and if it did, the addition of more bromide would not increase the evil, inasmuch as whilst the addition of bromide might in some cases increase the transparency of the film, it would at the same time shorten the exposure, so that the risk by increased transparency would be counterbalanced by short exposure. But if the trans-

parency of a film were the cause of the blurring peculiar to the tannin process, how is it that it is not seen in other dry processes? Dry albumen plates are especially transparent, and generally require very long exposure, but no such blurring occurs in negatives produced on them. Again, on the theory that bodies sensitive to actinic light do not transmit actinic light, this apparent transparency of the film amounts to nothing. A plate of glass coated with collodion containing chloride of strontium appears colourless and transparent, but it is quite opaque to actinic light, not transmitting any of the actinic rays. Those rays of light which pass *through* a body, do not exercise influence *on* it. For a fuller elucidation of this idea, which is, we think, fully supported by practice, see closing portion of an article on p. 183 of our present volume. We think the blurring arises from a chemical, not an optical, cause. We shall be glad if Major Russell will consider this, and let us hear further from him.—Ed.]

Talk in the Studio.

Fraudulent Lenses.—We are requested to call attention to an advertisement, in another column, referring to fraudulent imitations of Mr. Dallmeyer's lenses. In order to guarantee photographers against fraud in such cases, Mr. Dallmeyer informs us that he will, at all times, have pleasure in examining and verifying any lenses purporting to be of his manufacture, which may be in the hands of dealers. *Verbum Sap.*

Taxing Photographs.—Photographers in the United States have their share of war taxes; besides a general increase in the price of photographic materials, and a very serious rise in the price of chloride of gold, a recent tax makes the price of alcohol and other fourfold greater than before. There is also before Congress at the present moment a Bill for levying a tax upon every photograph issued. It is proposed to lay a tax of one penny upon every photograph which costs less than one shilling; on photographs costing from one to two shillings, three halfpence; on photographs from two to four shillings, two-pence halfpenny; and two-pence halfpenny more for every fraction of a dollar, when the price of the picture exceeds that amount. The photographers of Boston have had a meeting, at which they resolved upon a general increase of 25 per cent. to the public in consequence of this tax. They also agreed upon a scale of prices from which it would appear, that largely as the art is practised in America, it has not fallen so low in price as this country. They agreed that glass positives should not be taken lower than the following prices:—for a picture 2½ inches by 2, not less than half a dollar (2s. 1d.); for a picture 3¼ by 2¼, not less than a dollar (4s. 2d.); and for 4¼ by 3½, 7s., not including cases. Is was then agreed that a photographic society should be formed in the city to maintain the interests of the art.

Nitrate of Ammonia and Fuming.—A correspondent sends us some excellently printed cards, and says:—"The paper is sensitized in an old collodion bath, with nitrate of soda added, and afterwards fumed with ammonia. I have now used a weak bath and nitrate of soda for a year, and have often thought that the reason so many do not succeed with it is because they do not fume the paper with ammonia after sensitizing. I find this makes all the difference between a good print and a bad one, and also makes the paper print much quicker. I have tried nearly every paper in the market, and never once had the albumen dissolved off."

Nitrate of Bismuth as a Substitute for Chloride of Gold.—M. J. Balsamo has shown (*Cosmos*, 13 Oct., 1863) that nitrate of bismuth can be employed as a toning bath in place of chloride of gold. To obtain the bath the metal is dissolved in nitric acid, and an excess of acetic acid is added to prevent the formation of an insoluble subsalt when water is added. If this compound is found to answer the purpose as well as chloride of gold, it is needless to state that it will be infinitely cheaper than the latter.—Dr. Phipson, *Le Prèparateur Photographe*, &c.

Explosion of Gun-Cotton.—Dr. Phipson writing to the *Times*, in reference to the terrible explosion of gun-cotton, accompanied by loss of life, in the works of Messrs. Prentice and Co., says: "It is supposed to have been caused by a spark from some steel machinery. Photographers will remember that a year or so ago the photographic chemist Dornbach lost his life by an explosion of gun-cotton while packing this substance into a cask by means of a wooden pole. Since that sad occurrence I have already twice stated that the explosion which killed Mr. Léon Dornbach was evidently caused by an electric spark. Persons who handle gun-cotton are apt to forget (or perhaps are not always aware) that it is one of the most electrical substances known, and that friction, far too slight to develop heat enough to inflame it, will develop in gun-cotton so considerable an electric tension that electric sparks may be obtained from it."

Hint for a New Carbon Process.—Mr. Frank Eliot suggests the possibility of working out a very ingenious application of M. Poitevin's most recent carbon process. In this process, gelatine is first made insoluble by an application of perchloride of iron and tartaric acid, the subsequent action of light rendering the parts exposed soluble in water. Mr. Eliot proposes to mix a white pigment with the gelatine, and apply it to a black ground. After exposure and development, the image would be formed in white on a black ground, the lights being, as it were, impasted, and the shadows sunken. Mr. Eliot promises to write a short communication for the benefit of our readers, stating his suggestion a little more fully than we have done here.

[Advertisement].—Mr. Dallmeyer having consented to forego legal proceedings against me for having falsified one of his photographic object glasses, No. 7,262, by removing his lenses and substituting my own, and afterwards selling the said lenses as being of Mr. Dallmeyer's manufacture, I hereby offer him this public apology, and undertake for the future to act with good faith towards him and the public. Dated this 7th June, 1864. (Signed) Charles Burr.

Witness, W. A. Boyle, Solicitor for Mr. Dallmeyer.

To Correspondents.

*** We have to claim the indulgence of several of our advertising friends whose announcements are compelled to stand over this week.

J. S. L.—Rolling with a good rolling press would improve the surface of your prints, but the sample of albumenized paper does not appear a very good one. The print is also a little mealy. Using the toning solution older or weaker will, probably, in your case, be an improvement.

Tyro.—The production of a good tone is not entirely dependent on the toning bath, or, indeed, upon the printing at all; much depends upon the negative. With a thin or fogged negative a good print of deep tone cannot be produced. We strongly suspect that some of the fault lies with your negatives. The print enclosed would have been much better for considerably deeper printing; without a certain amount of reduction in printing, the exact depth being only ascertained by experience, rich deep tones cannot be obtained. With either the phosphate or the acetate you ought to get good tones. The carbonate is more uncertain; almost everything with it depends on using it at the proper time after mixing, which is not readily determined by an inexperienced person. As a rule, it will not work next day at all. 2. In your glass-house you have too much front light. Shut off by blinds the whole of the roof right at the side next the house, and a portion of the other side of the roof; and do not intensify so much. The print enclosed is over-intensified and under-printed, as well as lighted too much from the front. 3. We cannot form any opinion of the lens from the print enclosed. Send a full-length figure carefully focussed and clearly printed, and we can give you some idea.

W. D. J.—The prints enclosed suggest that your negatives are under-exposed. They have the appearance of being printed on paper kept too long after sensitizing, and so discoloured.

Happy Jack.—A well-cleansed bladder may be used for carrying water. An india-rubber bottle is very useful for the purpose: a piece of tube, with spring-tap attached, makes it convenient for use in the field. 2. It is probable that No 1 or 6 will answer your purpose as well as any. The splitting of the collodion in film is sometimes the fault of the collodion; sometimes induced by an over-acid bath, and very frequently caused by imperfectly-cleaned plates, and under-exposure, and over-development, and over-intensifying. If you are sure it is not produced by the latter causes, try a fresh sample of collodion. When the tendency is present, a dilute solution of albumen or gum arabic poured over the negative before drying will generally prevent the evil.

M. A.—The method of cleaning plates, which have been used for negatives intensified with bichloride of mercury, is to use a tolerably strong solution of nitric acid and water. A piece of felt or cloth about six inches wide, rolled up and tied tight so as to make a rubber, is the best thing to apply this solution with; the plates should be well rinsed immediately after applying the acid solution.

N.—We are glad to make the modification. It is better and more consonant with our feelings and aims to make it. Nevertheless, we can readily understand how the first phrase was written.

G. R. FITT.—The list of photographs announced in the NEWS as registered, simply constitutes our publisher's acknowledgment to those photographers who have forwarded photographs to him for registration, that the work is done. It would, doubtless, be interesting to publish a complete list of all photographs registered, by whomsoever they may have been done, but we fear it would constitute a list too lengthy for our publication.

W. P.—We believe that more than one patent has been taken for the production of photographs upon white enamel glass, but we are unable to say in what the patent consists. We do not for a moment suppose that any patent can exist, or be valid if it exist, merely for using this glass for photographs.

PHILO PHOTO.—Waste hyposulphite solutions are precipitated with sulphide of potassium, not sulphate of potash. Sulphuric acid may be used, but is more troublesome, as the solution and acid must be boiled together to precipitate the whole of the silver. 2. Hydrochloric acid may be used for precipitating the silver from wasting waters, &c., as a chloride, with advantage. 3. Of course, light concentrated by means of a lens acts more quickly than diffused light. 4. The cause and remedy for blisters in albumenized paper are doubtful. It only occurs with *Rive* paper; the best remedy is to use *Saxe*.

J. S.—We have not seen such a lens as you describe, and cannot with any certainty, therefore, say anything about it. 2. We do not know of any advantage arising from the use of Beanfoy's acetic acid, and it is not uniformly of the same strength. There is not any ready or simple way of ascertaining the strength of acetic acid. The purest ought to crystallize at a temperature of 50°; but even this is not a certain gauge, as it may be made to crystallize without being strictly pure. 3. There is no cheap work on photographic chemicals. The articles at the present time in progress in the NEWS are the most comprehensive yet issued. 4. Add nitric acid a little at a time to your carbonate of silver, until it is *nearly* all dissolved. 5. A half-plate lens is a good size for many purposes. 6. The plan you propose for a substitute for a glass-house, will, if properly managed, answer very well in fine weather; of course it will not protect from wind and rain. 7. Nitrate of ammonia is not a salt likely to be in ordinary price-lists, but may be had of manufacturing chemists. You may make it by adding carbonate of ammonia to dilute nitric acid until it is neutralized, and then evaporate and crystallize at a moderate temperature. 8. The use of a solution of iodine before intensifying (when that operation is performed before fixing) ensures greater cleanliness and freedom from fog. 9. The use of mercury in intensifying is somewhat uncertain, except in experienced hands. Pyro and silver are often used after mercury with advantage.

CONSTANT READER.—In order to ascertain the strength of a silver solution containing other bodies, such as nitrate of ammonia, it will be necessary to precipitate a portion as a chloride with a standard solution of salt. Proceed thus: take 17 grains of pure chloride of sodium and dissolve in 6 ounces of water. Now take a drachm of the silver solution and add the chloride solution a little at a time, but measuring it carefully. A drachm of the chloride solution will precipitate a grain of nitrate. If there be 40 grains of nitrate of silver in an ounce of the solution, 5 drachms of the chloride solution will be necessary to precipitate the whole present in the drachm of nitrate solution. If the mixture be well shaken between each addition, it will be easily seen when the last addition no longer causes turbidity. Mr. Hart's volumetric apparatus will enable you to perform the experiments to a nicety.

T. S.—We cannot state with certainty the cause of the precipitation of the chloride of gold you made, as several causes may have been in operation. In neutralizing with carbonate of soda, you did not probably take into account that carbonic acid might make the solution indicate an acid reaction after the nitric and hydrochloric acids were neutralized. If you thus got the solution quite neutral or faintly alkaline, standing in the light might cause the gold to be reduced, or a trace of organic matter in your rain-water might have a similar effect. It is easy to convert the precipitate again into chloride of gold by aqua regia, but not easy to ascertain the strength of the solution which will result without previous weighing. 2. The lighting and general qualities of your cards appear good. Possibly, a little more direct light and less diffused light would be an advantage. The printing is good, your success with the weak bath and nitrate of soda seems complete.

T. W.—We have never known the collodion made after our own formula, as given in our YEAR-BOOK, to split in drying; but we have not used it for larger than 12 by 10 plates. See answer to "Happy Jack," above. 2. The object of washing the plate between the application of an iron developer and an iron intensifier is to avoid the risk of fogging, which the remains of the decomposed developer and silver might cause. It is not always necessary, but merely a desirable precaution. 3. An iron developer may be used in a dipping bath; but it is generally difficult in such case to secure intensity, as, instead of the free nitrate of silver being reduced on the image, much of it is diffused through the mass of developing solution. The iron solution might, by filtering and strengthening, be made to last some time. 4. The cause of uneven patches in using bichloride of mercury and iodide of potassium for intensifying is the use of the solutions too strong. Use the bichloride of a strength of four or five grains to the ounce, let it remain on the film until it has produced an even grey tint, and nothing more, and then wash and apply a 1-grain iodide solution, and you will have little danger of uneven patches.

A. K.—From your description, it appears that your lens has a very curved field. Tilt the camera very slightly, lift the rising front a little, and use as small a stop as the light will permit. 2. It is very difficult to speak of average exposures, circumstances vary so; but it seems probable that your lens is rather slow. 3. We cannot speak with any certainty of the comparative value of the lens you name, not having tried it.

A. G. N.—When negatives get pinholes after they have been varnished, and have been printed awhile, it can only arise from wear. Sometimes a varnish drying with a somewhat rough and granular surface will rapidly cause the negative to get full of holes. On one of the causes of pinholes see our first article. Iodide of mercury under some conditions is a fertile cause of pinholes; we have at times seen a perfect negative completely covered with pinholes, after using this solution for intensifying. It is also apt to change in the light.

MAGENTA writes to say that a friend of his has been attempting to dye his hair, and the result is in some places a fine magenta and in others its complementary green! He wishes to know what will restore it to its original colour, grey. The question is a difficult one, as it is not stated what material he used for committing the folly of which he has been guilty. Presuming, however, that it is some preparation of silver, we fear that nothing will remove the colour without some danger. A solution of iodine, followed by cyanide or hypo, would probably remove the colour, but as the scalp is very absorbent, we cannot counsel him to risk the use of such remedies, which may seriously affect health. His best plan will be to submit to a very close cropping, repeated at short intervals, and the hair will rapidly grow out of its abnormal and brilliant tints.

F. VINCENT.—The marks appear to us to be caused by some mechanical stoppage to the flowing of the solution, which forms a nucleus of increased developing action, from the excess of silver at the spot. We are not familiar with solar camera work ourselves, but will make inquiry of some who have had much experience.

ANTI-CYANIDE.—A solution of hyposulphite of soda may be used to fix glass positives instead of cyanide. A saturated solution in a dipping bath answers well.

PATIENTIA.—The addition of tincture of iodine to your collodion would not make the negative of blue tint. Do you use citric acid in intensifying? That would induce blueness, and the use of acetic acid would in that case remove it.

DISAPPOINTED.—A lens of about four inches focus, when focussed for objects thirty yards distant, with large aperture, will probably give all objects beyond a satisfactory focus, but if the nearest foreground object on which the lens is focussed be much nearer than thirty yards, the ense will be entirely different. It is a primary condition of instantaneous photography, that the near foreground objects be not included, as you will ascertain by studying the works of photographers engaged in this branch. There is, probably, very little difference in the productions of any good maker, but there may easily be difference in the mode of using them. As a rule, you will find very few lenses which will define equally over a single plane with full aperture, still less over several planes. Consult the maker in question; it is probable that he will satisfy you.

Several correspondents in our next.

Photographs Registered during the Past Week.

VAISSIER ET VEREY, 31, Edgware Road, London,
Three Photographs of Mrs. Yelverton (Theresa Longworth).

MR. E. GREETHAM, 120, High Street, Portsmouth,
Two Photographs of H. J. Hogg, Esq., late of Portsmouth.

MR. WILLIAM HECTOR, High Street, Crediton,
Photograph of J. W. Buller, Esq., M.P.

MR. RICHARD D. CARTER, St. James's Green, Thirsk,
Photograph of Thirsk Church (north-east view).

MESSRS. LUCAS BROTHERS, 3, St. John's Wood Road,
Photograph (from oil painting) of the Racehorse Lord Clifden.

MR. WILLIAM MAYLAND, Huntingdon College, Cambridge,
Photograph—Distribution of Prizes by H.R.H. the Princess of Wales, to the School of Art, in the grounds of St. John's College.

MR. HENRY FRANCE, 64, Park Street, Bristol,
Photograph of the Choristers of Bristol Cathedral.
Photograph of Lay Clerks of Bristol Cathedral.
Photograph of the Choir of Bristol Cathedral, with Choristers, Lay Clerks, and Minor Canon.

MESSRS. J. TAYLOR AND SON, 22, Gold Street, Northampton,
Photograph of John Clare, the Northamptonshire Peasant Poet.

MR. WILLIAM WILBY LAW, 49, Gold Street, Northampton,
Photograph of St. Peter's Church, Northampton.

MESSRS. MOIRA AND HAIGH, 1, Lower Seymour Street, Portman Square,
Photograph of Rainandrianandraina, Aide-de-Camp of the Prime Minister of Madagascar.
Photograph of Rainifiringia, Officer of the Palace, Madagascar.
Photographic Group of their Excellencies the Madagascar Ambassadors, Rainandrianandraina, Rainifiringia, and the Rev. J. Duffus.
Photograph of Rev. J. Duffus.
Photograph of Dr. Charles Handfield Jones.
Photograph of Dr. Goodfellow, Middlesex Hospital.
Photograph of Dr. Fuller, St. George's Hospital.
Photograph of Dr. King Chambers, St. Mary's Hospital.
Photograph of Dr. Pitman, St. George's Hospital.
Photograph of Dr. Hall Davis, Middlesex Hospital.
Photograph of Dr. G. S. Fincham, Westminster Hospital.
Photograph of Dr. Radcliffe, Westminster Hospital.
Four Photographs of His Eminence the Cardinal Wiseman.

MESSRS. EDWARD SAWYER AND CO., 95, Clayton Street, Newcastle-on-Tyne,
Three Photographs—Instantaneous Views of Clayton Street, Newcastle-on-Tyne.
Photograph of Joseph Cowen, sen., Esq., Stella Hall.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to THOMAS PIPER, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 302.—*June* 17, 1864.

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THE NEW COPYRIGHT BILL.

We have just been favoured with a communication from Mr. Black, M.P., for Edinburgh, in answer to a letter we addressed to him, in which he informs that the committee, now sitting on his new Copyright Bill, have resolved to limit it to a mere consolidation of the present Acts, and that no amendment or alteration of the existing law will therefore be admitted. "Photographers," he adds, "need not fear that anything can be admitted affecting their interests." We shall take an early occasion after it is printed, of submitting some extracts from the Bill, as altered in committee, before our readers.

THE REV. WM. LAW'S IRON DEVELOPER.

Two recent communications, which appear on pp. 159 and 218, describe a modification of the iron developer by the Rev. William Law, which gives exceedingly fine negatives with one application of the solution without any further intensifying operation. On a recent visit to London, Mr. Law favoured us with a call, and showed us some of the negatives so produced, to enable us to form an opinion of their printing qualities. In this respect the negatives are especially excellent, having somewhat of a greenish black or dark olive tint when examined by transmitted light, with sufficient density to give brilliancy, without any loss of softness or modelling.

Mr. Law also brought us a bottle of developing solution made after a similar formula to that which we described before, but with some modifications which he found improved the results. This is formed as follows:—

Protosulphate of iron	...	...	6 oz.
Sulphate of ammonia	...	...	1 „
Crystallized sugar candy	...	...	1 „

Dissolve each of these separately in sufficient boiling distilled water to make a saturated solution, mix the three solutions together in an open shallow dish, and put the vessel aside to allow the mixture to crystallize. Of these crystals of ammonia-saccharo-sulphate of iron, take from 30 to 40 grains and dissolve in an ounce of distilled water, and then add from 50 to 60 minims of glacial acetic acid, and from 25 to 35 grains of citric acid. The solution is of a pale lemon tint, and keeps well. We have tried the solution which Mr. Law brought us, and find it answers admirably, developing slowly and regularly, the image gradually acquiring sufficient intensity, allowing by its slow action great control over the result. The deposit in our case was both by transmitted and reflected light of a black tint. We should also remark that Mr. Law observed that the crop of crystals obtained from a second crystallization of the residue after removing those first formed, were more of an amorphous character, had a more saccharine appearance and odour, and were more efficient and satisfactory in working than the first. For Mr. Law's detailed mode of proceeding in making his preparation, we must refer the reader to his communication of page 218 of the present volume.

THE PHOTOGRAPHIC EXHIBITION.

PHOTOLITHOGRAPHY.

Perhaps the most important illustration of progress in the present exhibition consists in the various examples of press-photography contributed, consisting of the photolithographs of Osborne and of Toovey; the photozincographs of Col. James, and the photo-electric engravings of Dallas, all of which are more perfect than we have seen untouched work at any former exhibition.

The photolithographs of Mr. Osborne are not framed, but are contained in a bound copy of the first part of a work at present issuing under the auspices of the Prussian Government, consisting of the illustrated account of an expedition to Japan, China, and Siam, sent out by that Government. The illustrations are facsimiles of some exceedingly clever pen-and-ink drawings made by an artist who accompanied the expedition. It will be seen at once that being the reproductions of pen-and-ink drawings, these subjects are in line, and do not involve the rendering of half-tone proper; but, of the kind, we can have no kind of hesitation whatever in stating these to be the best photolithographs we have seen, and more nearly resembling in their crispness and decision fine etchings than anything else. The pictures in the first part are views of Yeddo, in Japan, in size about sixteen inches by ten inches and upwards, four consisting of views in black ink on india paper, and two of photo-chromolithographs. If the first consisted simply of black and white, if the picture were merely rendered by lines of black of equal intensity, but different thicknesses, securing gradation by the fineness and distance apart of the lines, we might speak in the highest terms of the work, of the perfect cleanness, delicacy and decision of every touch, and of the entire absence of the rottenness and woolliness so common in photolithographs; but there is in truth a higher quality than that upon which the results, to which we have just alluded, depends. There is the rendering of absolute gradation of colour, or rather of gradation of intensity in black. The artist executing a pen-and-ink sketch, using indian ink, frequently obtains much of his effect in the more delicate portions of his picture, not merely by a fine line, but the use of less colour, producing a fine grey line, instead of a fine black line. This variation in intensity, from black to grey, Mr. Osborne has contrived to render perfectly, thus securing the artistic feel-

ing which must have been wanting in pictures by a process giving no gradation of intensity. It is probable that the direction in which Mr. Osborne has been endeavouring to obtain perfection is that which will prove of the greatest commercial utility, and it is in this sense decidedly the most important. The chromophotolithographs are very fine pictures. To what extent photography is employed and to what extent hand labour, we cannot state, but the result is very admirable, and reflects much credit on Herr Korn, who has been Mr. Osborne's lithographic associate in producing these pictures.

Mr. Toovey, of Brussels, exhibits some very admirable photolithographs, which, from their character and subjects, will, we have no doubt, win more admiration than any other pictures of this class exhibited. These consist of reproductions, but chiefly of subjects having a considerable amount of gradation, of a character closely allied to photographic half-tone. The best of his contributions consists of a noble picture, after Gerard's "First Missionaries in Belgium;" a grandly-conceived design for mural decoration. The picture from which this has been reproduced is evidently a chalk drawing, the photolithographic rendering of the texture is admirably done. The picture itself is very fine as a work of art, and loses nothing whatever by this mode of production, being delicate, round, and full of tone. Some other specimens by Mr. Toovey are very excellent, but this pleases us best. These pictures are produced by the process recently patented by Mr. Toovey, but in which, as we explained at the time, he had been anticipated by Mr. Lewis and by Mr. Hannaford, one of whom had patented, and the other had published, a similar process some years ago. It is clear that the process in question is a very excellent one, and Mr. Toovey states that a stone prepared by it yields, without injury, five or six thousand impressions.

Colonel Sir Henry James sends the only specimens of photolithography, or photozincography, rather, from negatives taken direct from nature, and aiming at the production by this method of photographic half-tone. The subjects are architecture and foliage, being chiefly views of various portions of the fine old ruins of Netley Abbey. Viewed as illustrations of scientific progress, these are very interesting indeed, and indicate very considerable improvement. There is, unquestionably, a fair amount of half-tone, and good blacks are at the same time secured, and in so far we gladly record the great progress made. As works of art, however, these are less satisfactory than the others we have noticed; there is a crude rawness about the pictures which leaves very much to be desired. We presume that the principle on which half-tone is obtained is that which Colonel James described some time ago, and we congratulate him on the progress made and the improvements these pictures illustrate. There is so much that is good already that we gladly accept the promise they present without too closely criticising the artistic merits of the present contributions.

Mr. Dallas sends a series of specimens of his photo-electric process, consisting of landscapes, portraits, and groups of birds. These all possess much merit, and the promise of more. Some interesting portraits on ivory illustrate the capability of his process in that direction, as affording the basis of a permanent photograph for the further work of the miniature painter.

Altogether the illustrations of press-photography are very gratifying, as presenting better results and more complete progress than we have before witnessed.

THE NEW CARBON PROCESS.

WE have received a considerable number of comments on the new carbon process and its products from abroad, and wherever the prints have been seen, the opinions have been enthusiastically favourable. Our French *confrères*, the respective editors of *La Lumière** and *Le Moniteur de la Photographie*, speak in the highest terms of the beauty and delicacy of the results. Dr. Vogel and Mr. Osborne, in Berlin, are equally gratified with the process and the pictures. Mr. Osborne, whose experience with gelatine and bichromate is very large, says: "I am perfectly delighted with Swan's process; there is a completeness about the process, and a decision in the statement of its details that give it great interest, and speak very highly for its inventor." In America considerable interest is expressed in the matter, but we have not yet received the comments we have sent out to some of our friends there. Mr. Carey Lea, writing on the subject, in the *Philadelphia Photographer*, makes some curious blunders from which a reference to our pages—somewhat necessary in giving his *résumé* of "Photography Abroad,"—would have saved him. He says the principle of exposing from the back attributed by Mr. Swan to Mr. Blair, of Perth, was really the discovery of Fargier. We have already stated that Mr. Burnett published the first statement of this principle in Nov. 1858. Mr. Blair, apparently independently, again published it in January, 1859, and if we remember rightly, first produced a carbon print by printing through the paper; M. Fargier did not publish anything on the subject until Dec. 1860; Mr. Lea is therefore very wide of the mark, indeed, in attributing its origin to M. Fargier. Mr. Lea claims the use of indian ink in the carbon process about a year ago; it was however patented in this country half a dozen years ago. Mr. Lea further states that in a report of a meeting at which the prints were shown, only one of them is stated to have been equal to a silver print. We cannot tell to which report Mr. Lea refers; but there has been no meeting in London at which they have been exhibited, at which several have not been spoken of as superior to silver prints. We note these errors because the statements of able writers like Mr. Carey Lea, in a respectable journal like the *Philadelphia Photographer*, are received as trustworthy by our transatlantic friends, and may at a future date be quoted as history.

* See the final paragraph in the letter of our Paris correspondent this week.

PHOTOGRAPHIC CHEMICALS:

THEIR MANUFACTURE, ADULTERATION, AND ANALYSIS.

IRON (*continued*).—Iron is not difficult to reduce to the metallic state. If a current of hydrogen gas be passed over oxide of iron at a red heat, the oxygen and hydrogen will unite with formation of water, and the metal will separate as a dark grey powder. If the reduction has taken place at the lowest practicable temperature, and the tube containing the reduced iron be allowed to cool, whilst the hydrogen gas is in contact with it, and it be then shaken out into the air, each particle of iron, on coming in contact with the atmospheric oxygen, will take fire with scintillation, and become reconverted into sesquioxide of iron. In this condition it is called iron pyrophorous. If the reduction is effected at a full red heat, or, if the iron after reduction at a low temperature be heated to redness for a little time before it is exposed to the air, the metal will be found to have lost the property of inflaming spontaneously, and may be shaken out and preserved in a stoppered bottle. Iron ostensibly prepared in this manner, is to be obtained at the druggist's, and in the new edition of the pharmacopœia, it is directed to be prepared by passing hydrogen gas over peroxide of iron contained in a gun barrel, and raised to a strong red heat in a furnace. If it were always prepared in this manner, there would be no fault to find with it, but we believe that reduced iron, or *ferrum redactum*, is frequently prepared by passing common coal gas over ignited oxide of iron. This effectually reduces the iron to the metallic state, but it communicates to it impurities, such as sulphur, phosphorus, &c., which this preparation ought to be free from. If reduced iron is prepared in a proper manner, it will be in the form of a fine greyish black powder strongly attracted by the magnet, and exhibiting metallic streaks when rubbed with firm pressure in a mortar. It should dissolve in cold hydrochloric acid, with the evolution of hydrogen, and when pure the evolved hydrogen

should have no perceptible odour. The odour of this hydrogen is the principal test for purity which can be adopted where the appliances of a laboratory are not conveniently accessible. Sometimes reduced iron is adulterated with black lead, this will be left behind when the iron is dissolved in hydrochloric acid. Reduced iron is of considerable use in the photographic laboratory, more especially when the photographer has no greater knowledge of chemistry than is necessary for the immediate purposes of his profession. It possesses a most powerful reducing action on solutions of the precious metals gold and silver, and it also brings per-salts of iron to the state of proto-salts. As the value of an iron developing solution depends solely on the amount of proto-salt of iron present, it is of some importance to the photographer to keep these solutions as free from excess of peroxide as possible. This he can readily secure by means of this reduced iron. A little of this powder taken up on the point of a knife, and dropped into an ounce or two of developing solution which has turned red, and lost its energetic action, will rapidly restore it to its original condition.

Iron in the mass being so readily oxidisible, it will naturally be inferred that this reduced iron will not have any less disposition to oxidise; this, in fact, is the case, and unless proper precautions are taken to preserve the finely divided metal perfectly dry, and well corked, it will be converted into oxide in a very short time. Perhaps the best plan for avoiding this result is to pour a drop or two of ether into the bottle containing the reduced iron. The ether vapour which will immediately fill the bottle, will effectually protect the iron from the action of the atmosphere, and it in no way interferes with any use to which the metal may have to be put, for the small quantity of ether adhering to the metal at once evaporates on exposure to the air.

When iron is wetted in contact with the air, it rapidly oxidises, being converted into hydrated sesquioxide. The action appears to be due to the iron uniting with the oxygen dissolved in the water, as if iron is exposed to water out of contact with air, it will retain its bright surface undimmed. If also iron be covered with a considerable thickness of water, the surface of which is exposed to the air, so that the transference of the oxygen of the air through the water to the iron may take place more slowly, the metal is not raised to so high a state of oxidation as the sesquioxide (Fe_2O_3) but will become magnetic oxide (Fe_3O_4). If iron is exposed to damp air it will not rust, provided no water is deposited on it, and the air is free from sulphuretted hydrogen, or acid vapours. This explains the reason why perfectly bright polished iron (or steel) will remain untarnished for so long a time in an ordinary room; the aqueous vapour has no tendency to deposit on the perfectly smooth surface. But if any portion of the iron be dim, or if there are cracks or scratches in the iron which are filled with black oxide, there is a tendency for vapour to deposit on these parts, and rusting at once takes place. By attention to these points polished steel goods, fire irons, &c., may be kept bright for years. When a little alkali is dissolved in water iron will remain bright under it for months; thus, one part of a saturated solution of caustic potash, or soda, will impart this preservative power to 2,000 parts of water. This fact is frequently made use of in large manufactories, and the iron shafting and other parts of the machinery are now sometimes preserved from rust by a coating of caustic soda solution, instead of oil or grease. Iron will not rust in lime-water, or in a saturated solution of borax. The purest iron generally rusts most quickly; hard wrought-iron, richer in carbon, rusts more slowly; then follows soft steel, then hard steel, then soft cast-iron, and, lastly, hard cast-iron; the presence of carbon therefore retards oxidation.

The purest iron which can be met with in commerce is pianoforte wire. This is of great use in chemical laboratories, on account of the uniformity of its composition, for the preparation of standard solutions for volumetric analysis. A small portion from one end of a large coil is generally analysed to begin with, and the remainder is then preserved for subsequent use in a well stoppered bottle. As it is important that the remainder of the coil of iron should always remain in the same state as it was when the piece was cut off the end for analysis, precautions are taken to preserve this wire scrupulously free from oxidation. The chemist effects this by filling up the bottle with quicklime in powder and lumps. This at once secures a thoroughly dry atmosphere, and prevents the possibility of acid vapours getting to the iron. Some iron in our laboratory which was so treated upwards of ten years ago is in as perfect a state now as when it was first put in. When a piece of this iron is wanted for use, it may be cut off and gently wiped from the adhering lime with a soft cloth.

Although iron does not decompose water at the ordinary temperature, or even when boiling, it at once decomposes aqueous vapour at a red heat. If a gun barrel is filled with iron turnings, and heated to redness in a furnace, and a current of steam is passed over, a copious evolution of hydrogen takes place from the other extremity of the gun-barrel. On the large scale this is perhaps the best method of obtaining hydrogen gas, and is of constant employment in chemical laboratories.

SUGGESTIONS FOR A NEW PIGMENT PROCESS.

BY FRANCIS G. ELIOT.

Beautiful and perfect as are the results accomplished by Mr. Swan in carbon printing, there are yet several tedious and troublesome operations in the manipulation of his process, which will prevent, for the present, I am afraid, professional photographers from taking it up quite as eagerly as might be wished, notwithstanding the much greater security it offers for permanence over our present silver process, the principal of these being:

Firstly, the not being able to have the films prepared as an article of commerce, to sensitize at pleasure, or even being able to prepare them in an establishment on dull days, in readiness for bright weather, as they must be prepared sensitive at once, and will not keep any great length of time.

Secondly, the having to mount every print after it leaves the pressure frame before developing.

And lastly, the reversal of the image from the numerous negatives now in stock, except by an after process of transfer.

Of course, none of these difficulties are insurmountable, and therefore, as between the profession and the public, it is simply a matter of £. s. d., if the public will pay extra for greater security, the profession will readily meet the wants; from what, however, I am able to judge of the process, I should say it would not answer to work under five or six times the prices we now charge for silver prints.

I have therefore been led to the consideration, whether it is not possible to devise some process which, while it offers equal advantages as regards permanency, should yet assimilate more closely to the manipulations of our present mode; namely, the being able to prepare a paper, having the requisite glaze to secure sharpness, which shall keep, and can be prepared as a commercial article, similar to albumenized paper; which can be rendered sensitive at pleasure: which will print direct from the negative, and will not require any transferring to bring to its correct position; and in furtherance of this object, I have been struck with the very great advantage the newly discovered process of M. Poitevin offers to accomplish the end I had in view.

M. Poitevin has found out that if a film of gelatine be submitted to the action of a solution of perchloride of iron, containing some tartaric acid, in the dark, it is immediately rendered insoluble: but by exposure afterwards to light, it is rendered soluble in proportion to the amount of time the light is allowed to act upon it. This is, I think, much too valuable a discovery to be overlooked; of course, I need hardly point out to your readers, that if paper is simply prepared with gelatine, and a *black* pigment, and submitted to the action of these chemicals; if placed under a negative,

a negative image would be the result, and we should, therefore, be obliged to print from a transmitted positive, which would also be obliged to be transferred from the glass, to print from the back, to get right and left correct; a process which would offer no advantage over Mr. Swan's.

I may, however, here perhaps call attention to the valuable use this suggests of *reproducing* negatives by one operation, a process very much in demand just now.

The following would no doubt be the plan: rub a glass over with Mr. Wenderoth's wax in ether, coat with collodion, let dry, then with gelatine containing some dark pigment, even some good non-actinic dye might answer, sensitize in the above acid salt of iron, dry, expose under a negative, develop in warm water, place on the surface while wet a sheet of Mr. Wenderoth's film, and when totally dry, strip all off the glass; it must be removed from the glass, or the image would be reversed; this trouble, although very great, for a number of positive prints, would be nothing for making a number of valuable negatives; if the film be sensitive enough for the camera, the copy might be obtained any size, and correct at once on the glass.

But to return to positive printing. The question naturally suggests itself, how to apply this discovery, so as to obtain proofs direct on paper; and as this process reverses the action of the light on the gelatine from that of the chromates, I have thought is it not possible also to *reverse the order of the tones of colour*, and instead of printing with a black material on a white ground, to print with a white material on a black ground? I think this offers so many advantages over other plans yet tried, that I hope those who have time will experiment in this direction, and give us the value of their labours. The following I would throw out for their experimental trials.

In the first place, paper might be prepared on a commercial scale by being evenly coated from a lithographic press, with a good purple or brown black tone; for trials on a small scale, purple sealing wax might be dissolved in methylated spirits, and the paper soaked therein; or even dilute stopping out black might do for a rough experiment.* Then the paper should be coated evenly with gelatine, containing some good semi-opaque white colour; zinc white being very fine, might answer best.

So far, the paper might be prepared by the albumenizers, perhaps by machinery like Marion's endless sheets. Then it can be rendered sensitive by floating on the acid salt, same as we now silver our paper; when dry, place under the negative. And here I think there would be an advantage, that working on a *white* material instead of black, we might be able to see something of what we are about.

The developing can be done in warm water, the same as Mr. Swan's, and any after process that might be rendered necessary, would be the removal of any iron salt that might be in combination with the gelatine that had been unacted upon by the light. Possibly, dilute oxalic acid might be required; but the utmost the iron unremoved would do would be to give a reddish or pink tone to the high light. Soaking in alum and water might indelibly fix the gelatine.

I think I have pointed out nearly all the advantages of this process, if it can be brought to as great perfection as the carbon. There is one more, however, which I cannot help mentioning. In examining the carbon prints exhibited by Mr. Swan, more particularly the landscapes, from my having constantly made a practice of examining stereoscopic slides without an instrument, to see if they are mounted correct. I could not but be struck with the very pseudoscopic effect they had to my eyes, on account of the blacks being raised so much above the high lights. The above would be perfectly free from this fault, and would possess the advantage of having the high lights raised, and the shades to retire, which all artists would commend as being correct, and would more nearly approach to that beautiful process which our present style of photography completely overthrew, but which all old photographers sigh over, as one of the glories of the past, namely, a genuine daguerreotype.

* A black glazed paper can be obtained of the fancy stationers, which will serve for experimental purposes.—ED.

ECONOMIC BATHS FOR SENSITIZING POSITIVE PAPER.

IN making trial of the various formulæ for positive nitrate baths of 6 to 8 per cent. the results fully confirm the opinion expressed by M. Van Monckhoven, that the nitrate of ammonia process is superior to all others.

Mr. Anthony has rendered a real service to photographers by the invention of the nitrate of ammonia process, not only as to the beauty of the proofs and the economy, but also in respect to the facility of working. The ordinary positive baths quickly dissolve the albumen, turn brown, and require to be continually purified by kaolin, the result of which is loss of nitrate and great variation in the acidity of the bath. If we add a large proportion of alcohol, the albumen does not dissolve, but it causes another inconvenience—the paper is too easily penetrated by the liquid, and the sensitizing becomes irregular. With the new bath these inconveniences do not occur, when care is taken to keep it decidedly acid.

M. Van Monckhoven, in an article published in the number of the *Bulletin Belge*, for January 15th, gives the details of a mode of preparing the positive bath by means of nitrate of ammonia. We now add some remarks intended to facilitate the manipulation.

When silver is precipitated in the state of oxide from its nitrate, by means of caustic soda, it happens that the liquid remains more or less coloured. The colouring matter is also in very great quantity when we take old baths, which have served for sensitizing albumenized paper, and the weakest parts are precipitated with the oxide of silver. When the oxide of silver is afterwards treated with nitrate of ammonia, the substance in question is not dissolved, and, consequently, we may be led to add a great excess of nitrate of ammonia to the bath. To avoid this error it will be sufficient to treat a sample of the undissolved precipitate with nitrate of ammonia, and if no more is dissolved, cease adding nitrate to the bath, and after it has been acidified, filter it.

Let us observe, *en passant*, as an advantage of the new process, the utilization of old baths, the silver of which is precipitated in the state of oxide, to be treated immediately after the washing by nitrate of ammonia. In this case, it is not indispensable, to test the old baths very accurately, we may content ourselves with comparing the volume of the oxide of silver obtained, with that produced by one or two grammes of nitrate of silver. For this purpose we employ a graduated test tube, and we can easily find, with a sufficient approximation, what quantity of nitrate corresponds with the precipitated oxide. We finish by adding the water requisite to reduce the bath to the strength of 8 per cent.

An excess of nitrate of ammonia in the bath does not appear to us to have an injurious effect upon the beauty of the proofs. We must not, however, lose sight of the fact, that many operators attribute in part the want of success in toning, sometimes experienced, to the presence of a large quantity of alkaline nitrate in the ordinary positive bath which has been frequently strengthened.

When the paper is sensitized and dried (as much as possible without the aid of artificial heat), it must be submitted to the ammoniacal fumigation. Here some causes of failure present themselves. If the quantity of ammonia is too large, or if the paper remains too long under the action of this gas, the proofs tone badly: they retain a red hue even after they are dried. If the ammonia accumulates in certain parts of the fumigating box, the proof will not tone uniformly. If the dessication of the paper is not regular, the action, of the ammonia will not be so either, and mottled proofs will be result.

All the efforts of the operator must be directed to render-

ing the action of the ammonia upon the paper very uniform. This result is attained by the following means.

1st. By employing the liquid ammonia in small quantity, extended over a large surface, in order to favour the rapid and regular disengagement of the gas.

2nd. By separating the place where the ammonia is disengaged from that where the paper is deposited by a horizontal screen of fine tissue.

3rd. By avoiding to place the sensitized surface of the paper opposite the place where the ammonia is disengaged. Our fumigating box is nearly cubical, and measures about sixteen inches each way. It is divided vertically into two parts, by a frame upon which a piece of gauze is stretched. Under this diaphragm, nearly at the bottom of the box, is placed a glass plate, sliding in a groove through an aperture in one of the vertical sides. Above the diaphragm a second frame is fixed, furnished with threads crossing each other at right angles, so as to form a coarse net-work.

The paper to be fumigated is placed on the network of the upper frame, and the cover of the box is closed. Then draw out the glass plate upon which the ammonia is poured, and rapidly spread by means of a tuft of cotton or paper, and quickly replaced in the box.

The time during which the paper must be submitted to the action of the ammonia varies with the temperature, the nature of the paper, the quantity and also the strength of the ammonia solution, and very probably with the degree of acidity of the silver bath.

The following data will be found very useful:

The paper best adapted for the purpose is Rives's (French), strongly albumenized. It is sensitized by being floated for four minutes on the nitrate bath, at a temperature of about 50°. When it is dry, it is passed for a quarter of an hour into the fumigating box (temperature from 56° to 60°). About half a drachm of commercial solution of ammonia is spread on the glass plate. If time presses, and it is necessary to dry the paper by artificial heat, care must be taken to allow it to dry spontaneously until the sensitized surface has lost all its gloss. The aspect of this surface is then of a perfectly uniform flat white.

It is as well to warm the paper slightly after fumigation, in order to disengage the uncombined ammonia. For toning, employ a very dilute alkaline bath. Fifteen grains of chloride of gold will suffice for the preparation of seven or eight pints of bath solution. It is well understood that we must make the chloride of lime act upon the chloride of gold in a much smaller quantity of water, and that the remainder of the liquid must be added only at the moment of making use of the bath. This toning bath will not keep like that with acetate of soda, for which reason only sufficient quantity must be prepared at a time for next day's use.—*Bulletin Belge de la Photographie.*

LENSES AND LIGHT.*

Take a thin plate of brass, copper, or any other metal, and drill holes in it of various sizes, of one-sixteenth of an inch in diameter and upward; into each of these, let fall a drop of canada balsam, and allow it to dry. In this way, we obtain a number of lenses of various powers. Drops of water would be, in like manner, equally good, but they are not permanent. If you are sufficiently expert with the blow-pipe, small fragments of glass can be inserted in each aperture of the metallic plate, and then melted: these fragments thus melted will assume a lenticular shape, and when cool are permanent lenses, and are permanently fixed.

Such lenses will be convex on either surface, and are hence denominated double convex lenses.

If one of the surfaces be flat, while the other is convex, the lens is called plano-convex.

Let one of the surfaces be convex, while the other is concave, we shall then have either a meniscus, or a convexo-concave lens. It will be a meniscus if the concavity be less, that is, flatter, than the convexity; and a convexo-concave, or a concavo-convex, if otherwise.

If both the surfaces of a lens are concave, the lens is denominated double concave.

When one of the surfaces is concave, while the other is flat, we have a plano-concave lens.

We conceive light to consist of lines or rays proceeding from the object to the eye. Take a glass tube of any given length, and fill it with fine wire, placed side by side longitudinally, each wire being about twice as long as the tube; these wires may represent rays of light; while in the tube they are parallel, and together form what is denominated a beam of light. At their exit, let them be pressed asunder, so as to form a sort of brush; this latter is called a diverging pencil, or a converging pencil, depending upon the direction; if the light proceed *from* a point, and spread out, it is diverging; if in the opposite direction, or proceeding *to* a point, it is converging.

From every point of any object, there proceeds a diverging pencil of light; the middle ray of each pencil is called the *axis* of the pencil; this ray, and those which immediately surround it, are the most efficacious in producing a visual conception of the point from which the pencil emanates.

The property of a double convex lens, of a plano-convex, and of a meniscus, is to convert a beam of parallel rays into a convergent pencil, or to make a divergent pencil less divergent, and even convergent; whereas, the property of a double concave, of a plano-concave, and of a concavo-convex, is to convert a beam of parallel rays into a divergent pencil, or to make a convergent pencil less convergent, and even divergent.

The *axis* of a lens is a line which passes right through the middle of the lens, and perpendicular to its surfaces at this point.

The *vertex* is that point where the axis touches the surface of the lens.

The *focus*, that is, the *principal focus* of a lens, is the burning point of said lens; it is the point where the parallel rays from the sun converge as they pass through the lens, and cross each other on the axis.

The picture of an object is always found on the axis of the pencil; and the axis of a pencil passes through the centre of the lens, and is continued on the other side, parallel to its original direction.

A point emitting rays of light is called a *radiant;* the pencil from such a radiant is divergent, until it passes through a convex lens, when it becomes convergent, either backward or forward to another point; this point, on the axis of this convergent pencil, where the rays cross, is another radiant or focal point; the two points are *conjugate foci.*

When a ray of light enters a pane of glass obliquely, it is broken out of its direction, and when it leaves the pane of glass, it is again broken, and moves on in a direction parallel with the original direction, but shoved a little on one side. This property of breaking is denominated *refraction.*

Some transparent media refract more than others; the more they refract, the more they can be made to magnify when ground into the form of lenses.

If a ray of light enters a transparent medium perpendicularly, it is not refracted at all; the more obliquely it enters, the more it becomes refracted.

Therefore the central parts of a lens refract but very little; while the peripheral parts refract most; and the refraction is greater as the curvature of the convexity increases.

But the greater the refraction of the peripheral rays, the sooner they will cross each other; and where they cross each other, is the picture of the object.

From this fact, it is evident that there is an indefinite number of pictures of the same object at different distances from the lenses, that is, briefly, a picture made by the central rays, the pictures by the intermediate rays, and another by the external or peripheral rays.

Such a multiplicity of pictures at different distances produce confusion; and the property of a lens that produces such confusion is denominated *spherical aberration.*

When a ray of light passes through a transparent medium, whose surfaces are not parallel, it is subject not only to refraction but to *decomposition.* It is thus found that light is not homogeneous, but consists of several coloured rays mingled together, according to a regular and fixed law, which, when so mixed together, form what we call white light.

White light consists of at least seven well defined different coloured rays. These are red, yellow, green, blue, purple, indigo, and violet; others are less distinctly defined.

* "American Photographic Almanac."

These coloured rays are not broken equally when they enter or leave a transparent medium, and consequently, they do not converge to the same focal point on the axis after they have left a lens. On this account are formed coloured pictures of the object at different distances on the axis.

Of these colours the violet is the most *refrangible*, and red the least: consequently, the violet picture is nearest the lens, and the red picture the furthest off.

But such a multiplicity of coloured pictures will, in like manner, produce confusion on a ground glass, at a given distance; and this confusion is denominated *chromatic aberration.*

A convex lens, therefore, is subject to both these aberrations. Certain transparent media have the power of separating the coloured rays further apart than others, so that the angle between the red and the violet ray is greater in some instances than in others.

This property is called *dispersion.* It is made available in the correction of chromatic aberration.

A single lens can be made free either from spherical aberration or chromatic aberration.

The single lens which has the least spherical aberration is double convex, but not of equal convexity; in plain terms, one surface is six times more convex than the other; or, technically the radii of curvature are as one to six.

By combining different sorts of glass, and by grinding their surfaces to peculiar curvatures, according to formulas which the sound mathematician alone can develop and understand, compound lenses can be constructed so as to produce pictures free from *all colour*, and *at the same point*, or *on the same plane.*

A compound lens so combined is said to be corrected *aplanatically* and *achromatically.*

But these are not the only troubles inherent in lenses. There are in each lens invisible rays, which are ascertained to be near the region of the violet rays; and these invisible rays are those that are, in fact, the most essential in photography; they produce the picture by acting upon the film of silver. The rays that manifest the picture on the ground glass have nothing to do with the production of the picture on the collodion film.

Thus it may happen that a compound lens may produce a very excellent luminous image on the ground glass, and yet can never produce a similar excellent picture on the collodion film.

Now the rays that act upon chemical compounds so as to produce their decomposition, although invisible, are denominated actinic rays; and the property inherent in such rays is called actinism.

Actinic rays are more refrangible than the luminous rays; a correction, therefore, is required, by which the foci of the actinic rays shall coincide with those of the luminous rays.

The magnifying power of a lens is measured inversely by the distance from the principal focus to the centre of the lens; that is, the greater this distance, the less it magnifies.

But the centre of a single lens is not always easily obtained, and that of a compound lens with much more difficulty. It is, therefore, customary to measure the focal length from the burning point to the surface of the lens next to it, or the distance between the ground glass, on which the moon has been accurately focussed, and the nearest surface of the single lens.

The power of a single lens can thus be determined, which is inversely proportional to the distance found as above.

The power of a compound lens is compared with that of a single lens that will produce the same sized picture of an object at the same distance from it.

We are in the habit, therefore, of using the terms *equivalent focus* in reference to a compound lens.

The equivalent focus of a compound lens can be ascertained by first selecting a single lens that will produce an equally large image of an object whose distance in reference to the two lenses is precisely the same. This plan, however, would be very tedious.

It is a well-known fact in optics, that when the image on the ground glass is exactly equal in size to that of the object, then one-fourth of the distance between the image and the object is equal to the true focal length or true equivalent focus.

The corrections for spherical aberration, chromatic aberration, and actinism, cannot be produced completely by two lenses in combination; a combination of three lenses can correct more effectually than two; and a pair of compound lenses of two each can be made to correct still more than one of three pieces.

ON THE YELLOW COLOURATION OF FADED PHOTOGRAPHIC PRINTS.

BY M. CAREY LEA.

EVERYTHING connected with the permanence of photographic products has an interest so vital to photography that nothing connected with it can be considered as trivial. We are yet groping in the dark as to the causes of failure. "Sulphuration" is a convenient word, but it would be more satisfactory if we had some idea as to the nature of the obnoxious insoluble sulphur compound.

The hypothesis which has for some time past become current is that the fading depends upon the presence in the print of some sulphur compound, which, with time, acts upon the silver, converting it, as is said, into sulphide. Sulphide of silver we know as a jet black substance, and we habitually convert the reduced silver of negatives into sulphide, when we wish to intensify them. Why, then, should the production of sulphide of silver strengthen a negative and destroy a print?

MM. Davanne and Girard answer as follows:—Sulphide of silver prepared by itself is, they say, black; but, formed in presence of organic matter, the organic matter enters into the composition, and the compound is yellow. To prove this, they precipitate a solution of silver with sulphuretted hydrogen, and find it violet black. They again precipitate the same solution in presence of starch, and obtain a yellow precipitate.

I have paid much attention to the subject of the fading of prints, and had been forcibly struck by the anomaly above referred to. The explanation of the gentlemen just mentioned seemed very satisfactory, but the question appeared to have too much importance to pass it by without verification. The following results were obtained:—

In a test-tube was placed a little boiled starch, in a second tube some water. Two or three drops of a five-per-cent. solution of nitrate of silver were added to each, and then hydrosulphate of ammonia. *Both* solutions gave a yellowish-brown precipitate without the slightest difference in shade or colour. The precipitate afforded by hydrosulphate of amonia could not here differ from that produced by sulphuretted hydrogen; but to remove any doubt on this score, the experiment was carefully repeated with sulphuretted hydrogen. The same result precisely was obtained. As a further confirmation, the experiment was varied by the substitution of another organic substance, viz., collodion, instead of the starch. The result was precisely similar.

The different result obtained by MM. Davanne and Girard can perhaps be explained as follows:—The sulphide of silver is a heavy substance, and when thrown down from a simple watery solution it quickly subsides. But solutions thickened with organic matter, such as gum, starch, gelatine, &c., retain a precipitate for a long time in a state of suspension, thus preserving the original yellowish-brown appearance. If, therefore, we prepare solutions as above, and pass H S through them, allowing them to subside, and examine them only after a time, we shall find in the one case a black precipitate below a colourless solution: in the other a brownish viscid liquid. But if we watch the process from the outset, we shall see that the reactions are chemically identical, and differ only in respect to the mechanical suspension which takes place in the one case.

The experiment which I here cite may throw some light on the origin of the yellow colour. It appears that when the sulphide of silver is in a state of very fine division its colour is yellowish brown, as may be easily ascertained by treating a very dilute solution (*e. g.*, 1-5000th) of nitrate of silver with hydrosulphate of ammonia. Many substances are only black in consequence of excessive intensity of colour. Lampblack, for example, in a state of excessively fine divison is yellowish brown. Ink diluted is purple. Claus has shown that the intensely black hydrated sesquioxide of ruthenium is, when very finely divided, green.

I therefore conclude :—

1st. That it is as yet not absolutely demonstrated (although probable) that the current opinion, ascribing the fading of pictures to the production of sulphide of silver, is correct.

2nd. That if this opinion be correct, there exists no evidence that organic compounds have anything to do with the production of a yellow colour; the tint of sulphide of silver found in their presence and in their absence being quite the same shade of yellow-brown.—*Silliman's Journal.*

Proceedings of Societies.

South London Photographic Society.

The Annual Meeting, and last of the present session, was hold in the City of London College on the evening of Thursday the 9th instant. The Rev. F. F. Statham, M.A., F.G.S., occupied the chair.

Prior to entering upon the business proceedings of the evening, a conversational discussion on several topics was held.

Mr. Farringdon Lane exhibited a neat and convenient printing frame for small plates, which presented ready facilities for examining the progress of the printing, over considerably more than half of the negative at one time. The frame seemed to meet with general approval.

Mr. Wharton Simpson exhibited a print by Mr. Bingham, produced by the Poitevin-Fargier process, and in answer to some questions explained that, in that process, a plate of glass was coated with gelatine containing pigment and bichromate, and after exposure under a negative whilst still on the glass, the film was coated with collodion, after which the whole was plunged into warm water, which removed the gelatine and collodion together from the glass, and washed away the unaltered gelatine and pigment. Whilst the film was thus floating in the water, a piece of paper was placed under it, and the gelatinous surface then became firmly attached to this paper. This was stated by Mr. Bingham, and other gentlemen who had worked the process in Paris, to be a less difficult operation than it appeared. He had tried it, and with the limited experience he at present possessed, decidedly preferred the manipulations in Mr. Swan's process. He had, however, taken a hint from it as to a mode of transferring Mr. Swan's prints, which he thought might be adopted with advantage. It consisted in applying a piece of albumenized paper to the gelatinous surface of the developed print, when it was completed and before it was dried. It adhered then very perfectly, and the original paper on which it had been developed, could easily be afterwards removed.

Some further conversation on carbon printing followed, and Mr. Simpson gave some particulars on keeping the tissue, which appeared in an article in our last.

The Chairman then said that members would be glad to learn that the committee had selected two prints for presentation to the members, which would probably be ready for distribution at the first meeting of the winter session. They consisted of Mr. Robinson's "Somebody Coming," and a landscape by Mr. Bedford.

Mr. How exhibited a hastily constructed model of a washing machine, by Mr. Spencer. After some conversation on the subject,

Mr. Wall presented the last number of the *Art-Student.*

Messrs. T. Turner, James How, and W. Corrie were elected members of the society.

The Secretary then read the following :—

annual report.

Having once more reached that stage in the career of this society at which it is customary to erect a sort of commemorative or votive tablet in the shape of an annual report, we, the retiring officers of the past session, duly present the same to the members.

During the expired year, we have been favoured with the papers given in the following list :—

1863.

June 11th.—"On Developing and Intensifying Negatives." By J. Leake.

,, —"On the Action of Formic Acid in the Developer." By H. Cooper, jun.

Sept. 8th.—"A Few Thoughts About Photographic Societies." By A. H. Wall.

Nov. 12th.—"On Photography in India." By W. H. Warner.

,, —"On the Best Proportion of Chloride for Albumenized Paper." By Alfred Harman.

Dec. 10th.—"On Composition Printing." By Walter Woodbury.

,, —"On Glass Rooms and Lighting the Model." By T. Parker.

1864.

Jan. 14th.—"On Printing." By H. Cooper, jun.

,, —"On Formic Acid in the Developer." By H. Cooper, jun.

Feb. 11th.—"A Discussion on Toning with Chloride of Lime." Opened by Valentine Blanchard.

Mar. 10th.—"On a Photographic Provident Society." By A. H. Wall.

,, —"On Nitrate of Soda in the Printing Bath." By a member signing himself "Publicola."

,, —"On the Probable Action of Nitrate of Soda in the Silver Bath." By F. W. Hart.

May 12th.—"On Mr. Swan's Carbon Printing Process." By H. Cooper, jun.

The discussions on each of the above subjects were very animated, and the thanks of the society were heartily awarded to the gentlemen from whom they emanated.

The thanks of the society are also due to the following gentlemen for exhibiting and describing various useful inventions and contrivances, viz. :—

To Mr. G. Wharton. Simpson, for specimens illustrative of the qualities of well-known lenses, processes, collodions, &c. &c.

To Mr. Dallmeyer, for exhibiting a new arrangement in a camera constructed for twelve small pictures on a single plate.

To Mr. A. H. Wall, for exhibiting various specimens illustrative of artistic beauties and pictorial science, &c.

To Mr. F. W. Hart, for exhibiting and explaining improvements in apparatus practically illustrating the use of the magnesium light, &c. &c.

To Mr. J. J. Cole, for calling attention to the photographic use of tracing linen.

To Mr. Sanford, for specimens of a new photographic paper.

To Mr. H. Cooper, jun., for specimens illustrative of various useful experiments.

To Mr. J. Martin, for ditto.

In addition to the above, the society also desires to express its thanks to the many other gentlemen who kindly contributed the photographs and apparatus by which the pleasures of each evening have been so materially enhanced.

The special thanks of the society are due to the President, Vice-Presidents, Treasurer, and Secretary of the past year; to Mr. J. J. Cole, for kindly placing rooms at the disposal of the Committee; and to Mr. Fox for generously promising to mount the society's collection of photographs free of cost.

The officers of the society congratulate the members upon its continued prosperity. Although the difficulty of procuring papers for the meetings has not been greater this year, considered with reference to past years, still this difficulty exists, and we therefore appeal to the members and friends of the society to lessen or destroy it by rendering the truth of the proverb, which says—"One volunteer is worth twenty pressed men," once and again apparent. Thirteen papers for nine meetings displays no poverty of resource, nor is there any lack of variety in the subjects they treat on; but the readers and authors of these papers are too few in number, and the society has no right to exact labour which may be given with inconvenience to the person most concerned. The authors of the first papers read at the society are, with very few exceptions, the authors of the papers we now have the pleasure of listening to, and it is neither fair nor wise to let the mainstay and safety of the society be dependent upon a few gentlemen whose membership must, of course, be subject to all the usual fluctuating influences. While the very existence of the society as an active, enterprising, and useful body is bound up with their membership, the society can never be regarded as firmly and thoroughly established.

The number of new members elected during the past year shows that the society has not lost ground in public estimation.

The attendance at each meeting, with two exceptions, has been highly satisfactory.

The Committee regret that the presentation print for this year—Mr. H. P. Robinson's "Somebody's Coming"—was not earlier decided upon, in order that it might be now on the table for distribution. This picture is that which carried off the prize in Scotland and elsewhere, and has been chosen for presentation to the members of the Photographic Society of Scotland.

There is little to be said in connection with the progress of the art itself during the past year, the only novelty being the important one of Mr. Swan's new carbon process, which has already received notice at a meeting expressly devoted to its consideration.

One subject only remains to be mentioned in this the fourth annual report of your society, and that is the regret its members must feel in hearing that in consequence of his removal to the

northern suburbs of London, Mr. Cole thus ceases to be a member of the society.

The Treasurer's account was then read from which it appeared that a balance remained in favour of the Society of £7 15s. 0d.

The SECRETARY then read a series of new rules determined upon at a recent committee meeting. These, after being considered *seriatim*, were modified, expunged, or confirmed, a satisfactory code being finally arranged, which will be printed for distribution.

The following officers for the coming year were then duly elected:—

President.—The Rev. F. F. Statham, M.A., F.G.S.

Vice-Presidents.—Messrs. Sebastian Davis, G. Wharton Simpson, and A. H. Wall.

Committee.—Messrs. Foxlee, Hart, Harman, Harmer, Martin, Cooper, How, and Blanchard.

Hon. Treasurer.—Noel E. Fitch.

Hon. Secretary.—Frank Howard, 10, Lansdowne Road North, S., and an assistant secretary to be paid by the society, and engaged by Mr. Howard.

Mr. DAVIS, in cordial terms, proposed a vote of thanks to Mr. Wall, the retiring secretary, which was seconded by Mr. SIMPSON, who pointed out the onerous nature of the duties, which the society now recognized by recognizing the necessity of an assistant.

The vote was carried by acclamation.

Mr. SIMPSON proposed a vote of thanks to Mr. Statham for his able and courteously rendered services as chairman during the year.

Mr. HOWARD seconded the resolution, which was carried very heartily, and acknowledged by the chairman.

The question of out-door meetings during the coming summer was next discussed, and it was resolved that meetings be held on the second Saturday of July, August and September, meeting at the appointed place as nearly at two o'clock as trains would permit, at the following places:—

Saturday, July 9th, at Penge Station, for Beckenham Place.

Saturday, August 13th, at Richmond Station.

Saturday, September 10th, at Jack Straw's Castle, Hampstead Heath.

The proceedings then terminated.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 15th June, 1864.

AT the general meeting of the Society for the Encouragement of National Industry, M. Dumas, the President, made a most eloquent address, eulogizing the noble army of inventors. From this address I extract the following remarks upon one of the inventors of photography—Daguerre:—

"Some forty years ago I was consulted by a friend of the family of M. Daguerre. The strange conduct of this celebrated man gave his family much uneasiness. They thought his reason impaired. 'What do you think,' they inquired of me, 'of a skilful painter abandoning his pencils to pursue the senseless notion of seizing the fugitive pictures in the camera obscura, and of fixing them upon paper in a durable and material form?' I often recall the hours of meditation I devoted to preparing a reply which might, perhaps, render to Daguerre a repose disturbed by restless anxiety. If he had been diverted from his pursuit, who can doubt that photography would have never existed? Who knows how much time he devoted to the study, to ruinous experiments, and to fruitless attempts? Fifteen years! Yes; fifteen years separates the moment at which Daguerre was regarded as losing his senses from that which witnessed his triumph. When, at the expiration of these fifteen years of trial, he came to show me his wonderful plates (he knew nothing of it), but my first thought, I confess, was a feeling of gratitude to God, who had permitted me to be called to the defence of so fortunate a genius, and who had inspired me, in spite of my youth, with confidence to protect him against the mistaken zeal of his friends. With what interest I listened to him, while he related to me his hopes, his doubts, and his suspicions; for, during these fifteen years, Daguerre, whose artistic feeling it was so difficult to satisfy, and whose imperfect scientific education left him exposed to all the accidents of uncertain attempts, was alternately approaching and departing from the aim of his hopes, and realizing or abandoning the object of his indefatigable pursuit. Ill at ease with his family, whose interests he neglected, disturbed by the glory of his artistic life, which it would have been so easy for him to revive, the inventor of the diorama asked himself, at one moment, if he was not attracted by the mirage of an idle chimera; at another, if, in the day of success, he should find himself in the face of a spoiler. Where, in fact, was he to procure the silvered plates and chemical reagents without exposing his ideas to be stolen from him. Was he not compelled to apply in turn to every quarter in Paris, and never return, for the same object, to the same dealer? Was he not compelled to buy many useless articles with those he actually required, in order to divert indiscreet or interested curiosity? What care, what caution was needed! When, subsequently, he sought to obtain a picture, a fixed edifice, strongly lighted, was indispensable to him, he was constrained to work in the street, or in the open space around. Everything to him was gloomy then; the passenger who passed with an air of indifference, or he who stopped with so much inquisitiveness, or he who held aloof with unnatural reserve. Persons familiar with the writings of the alchemists can alone picture to themselves this *naïf* picture of the troubled life of Daguerre, thus doomed on the one side to the fears of failure, and on the other to seeing himself robbed of his treasure.

"To lose the finest fifteen years of his life, to neglect his material interest, to ignore the uneasiness of his relations, to live in doubt repeating discouraging experiments during the day, and at night reproaching himself with being a deserter of art, to demand, nevertheless, of science, a fame and glory which he had for a long time, a very long time, sought and waited for. This is the cost of such an invention, and the price at which a name in the annals of discovery must be obtained.

"On the other hand, would you know the profits that nations have derived from it? Ask of the commerce of Paris how many millions worth every year it manufactures of photographic instruments, and how many millions worth of pictures obtained by photographic means it exports? Think of the new and unexpected pleasures that each of us has experienced in collecting the cherished resemblance, which seems like an emanation, even, of the person loved, admired, or mourned.

"Ah! let us not cheapen inventions, but be kind and encouraging to inventors: beware of killing the goose that lays the golden egg! It does not happen to every one as it did to Daguerre: many die before the hour of triumph, others falter on the way. Invention is a struggle, a conflict, almost a battle: if the victors are rewarded, the dead are honoured, and the wounded carefully attended to. Glorify the inventors who succeed, cover with an indulgent self-respect the faults of those who fail, and soothe the last years of the wounded, of those invalids of industrial science, who have known only the pains of the fight, and always remained ignorant of the joys of victory."

M. l'Abbe Moigno comments on the above in *Les Mondes*, in the following terms:—"We were among M. Dumas' auditors, and, we must confess, that this episode of Daguerre astonished, disturbed and saddened us. Daguerre then is the sole inventor of photography, which, without him, would never have existed, and to whom all the honour belongs, so much so, that we may even dispense with mentioning the name of Joseph Nicéphore Niepce? Daguerre had devoted fifteen years to the discovery which matured in 1838. He would then have laboured since 1823! How can we reconcile these statements with the authenticated fact that on the

14th of November, 1829, Daguerre signed at Chalons, with Niepce, an agreement in which the latter, Niepce, expressed his discovery in the following terms:—'To fix by a new method, without having recourse to a draughtsman, the views presented by nature; this method consists in the spontaneous reproduction of pictures received in the camera obscura, by numerous experiments proving this discovery.' While Daguerre had, on his part, to confide under the seal of secresy only "the principle upon which rests the improvement he had made in the camera obscura, a principle which was nothing more than that of Dr. Wollaston's periscopic lenses. We entreat M. Dumas to explain himself."

M. Gaudin writes as follows in *La Lumière*, concerning Mr. Swan's carbon pictures:—"Mr. Wharton Simpson has had the kindness to send me by post a portrait obtained by Mr. Swan's process. *It is impossible to imagine anything more perfect.* There is a transparency and solidity in the chiaroscuro which the daguerreotype never surpassed. Mr. Simpson appears to believe that we shall not render Mr. Swan justice in France, at least, not all that he deserves, from a feeling of international jealousy: this will, at least, not apply to myself, who, on the contrary, have recently been reproached with not having in this respect proper national spirit, which is perhaps true. In this respect, I push impartiality as far as possible. I aim only at rendering justice to every inventor, whatever his country may be. In the present case Mr. Swan has perhaps the merit of having simplified the practice of the process he employs; but M. Fargier, especially, had previously obtained products quite as perfect, although perhaps not so readily in manipulation. In conclusion, I sincerely rejoice in Mr. Swan's success, for, judging by the specimen before me, its indelible quality, added to its high pictorial excellence, fully realize the ideal perfection of photography. Upon examining it under a strong magnifier, I clearly distinguish the texture of the fabric of the dress, which is more than ever could be done in daguerreotypes."

PERMANGANATE OF POTASH A TEST FOR HYPOSULPHITE.

Sir,—Will you allow me to say a few words in reply to your correspondent's letter, in last week's news, signed "N."

In the first place, I do not question for a moment that solution of permanganate of potassa is a test for hyposulphite of soda, that such is the fact is nothing new. So far back as 1856, in the third edition of "Hardwich's Photographic Chemistry," page 176, he recommends to dissolve from half a grain to two grains of the permanganate in one gallon of water, and says:—"To an *experienced* eye, it will prove the absence or presence of hyposulphite, the smallest trace of which is sufficient to remove the pink colour of permanganate." What I wished to point out in the experiments stated in page 263 of the News, was their likelihood to mislead inexperienced hands, who, on seeing the discolouration of the test solution, would be likely to infer the presence of hyposulphite, whereas it might be caused by the paper itself.

In the first place, eight minims of *permanganate* are ordered to be added to the ounce of water. Now, as permanganate of potassa exists as crystals, of what strength was the solution, of which eight minims are ordered to be added? Again, every chemist examining water for organic impurities, &c., does not pour a guessed quantity into different glasses, but measures each quantity carefully, and then notes the difference of colour produced in each on adding the permanganate solution; therefore, I think, it was of importance that the same weight of paper should have been put in each glass.

Your correspondent, moreover, concludes that as the piece of blotting paper produced the greatest effect, it must have been charged with hyposulphite, derived from the drainings from the print. All photographers must know the extreme difficulty of removing the last trace of hypo from the print, in fact, from recent experiment, I am enabled to say it is almost impossible to do so, by any mechanical means at present known; I have tried treatment with boiling water, with solution of common salt, as recommended by Mr. Spiller, alternate changes of hot and cold water, after Mr. Cooper's plan, and still found a trace. Is it likely, then, let me ask, that a *properly washed* print would give up the greater part of its trace of hypo, locked up as it were in the texture of the paper, to a piece of blotting paper simply attached to it? Supposing the prints very *imperfectly* washed, then, I admit, this might occur, and in that case "N's" experiments are conclusive. I have performed the experiments after the manner laid down by him, omitting, of course, the cistern water, many times very carefully, invariably with the following results;—After standing three hours, the solutions have presented the following appearances:—

No. 1. A beautiful violet.

No. 2. (In which I placed the sky of print) Light red, some might call it reddish yellow.

No. 3. (Same weight of blotting paper which had received the drainings of the print, quite dry) Nearly same colour, only cloudy.

The inference your correspondent draws from his experiments, that organic matter changes permanganate solution to *red*, and hyposulphite turns it *yellow*, is entirely wrong, as he can easily convince himself of, if he will trouble himself to make a few experiments; for instance, put two ounces of a solution of permanganate of a light violet tint into two glasses, adding a drop or two of sulphuric acid to both. Dissolve about eleven grains of hypo in ten ounces of water. To the solution of permanganate in No. 1 glass add ten minims of the hypo solution; to No. 2 add thirty minims. Note the difference. No. 1 solution *gradually* changes from violet, through all the varieties of colour, down to light red, and becomes muddy; No. 2 changes immediately to a light transparent yellow.

Take two other glasses, and fill with solution of permanganate of same strength as in first experiment, add to one forty minims of the hypo solution; to the other, a few drops of strong solution of quinine, morphine, or strong vegetable infusion, both solutions will go through precisely the same changes of colour down to light transparent yellow, or may be made colourless by adding more of the reducing agents. Therefore, solution of permanganate is not changed to *red* by organic matter, and to *yellow* by hypo; but excess of the reducing agent will change it to transparent yellow, or render it colourless, while excess of permanganate will be turned red and muddy.

But why use permanganate as a test for hypo, when open to so many objections, while so simple a test exists in solution of iodide of starch, the beautiful blue of which is instantly discharged by the *smallest* trace of hypo?

In conclusion, allow me to say that my remarks have been made from no spirit of antagonism, but simply from a desire to prove facts; and in such spirit, I hope, they will be taken. Claiming a thousand pardons for consuming so much of your valuable space, believe me, yours obediently,

W. A. Moss.

Royal Victoria Hospital, June 13th, 1864.

Sir,—Allow me to correct two errors that occurred in my first letter—one, a typographical one, the printer having inserted 5 grammes of paper as the quantity used, whereas ·5 or 5-tenths of a gramme should have been the quantity stated. The other is an error of my own. In the thirtieth line from the top I find I have stated that tetrathionate and hydriodate of soda are salts easily removable by washing. This remark should have been applied solely to the latter salt, as I find the tetrathionate of soda is anything but easy to remove, and, moreover, is exceedingly prone to decomposition, by being resolved into trithionate of soda, losing sulphur which would be deposited in the texture of the print.

$$Na\ O,\ S_4O_5 = Na\ O,\ S_3O_5 + S.$$

The consequence of this decomposition would be most disastrous to the print, therefore, I think, that my suggestion of decomposing the last trace of hypo by means of iodine untenable unless *extraordinary* care was taken with the after washing, carefully avoiding the use of *hot* water. I send a print treated in the manner described, the whites of which are quite pure.

During the week I have been engaged in a very careful series of experiments as to the *amount* of hypo existing in the washed and dried print. I am going over the whole again to verify the results obtained, and will forward the details to you if you consider them of sufficient practical interest.—I have the honour to be, sir, yours obediently,

W. A. Moss.

Royal Victoria Hospital, June 7th, 1864.

BLURRING IN THE TANNIN PROCESS.

Dear Sir,—In my letter which you inserted last week, I see there is a mistake in the last sentence. It should be, "when washed off I have NOT observed the same difference," *i.e.* in tendency to blurring.

In answer to your remarks, I said that increasing the proportion of bromide *may* increase the evil. It would doubtless shorten the exposure, even when it made the film more transparent, provided the unaltered bromide were sufficiently washed out; but whether or no, unless I am greatly mistaken, when the film is rendered more transparent, the tendency to blurring will be increased with equal effective exposures.

As far as I have observed, blurring is not peculiar to the tannin process, but it is seen more or less in all processes. My stereoscopic camera, like Mr. Sutton's, has a screen immediately in front of the slide, which cuts off all light outside two rectangular openings for the pictures. When part of the sky is cut off by the screen, a halo of gradually diminishing intensity commonly extends from the edge of the dark sky on to the shaded part of the plate; this effect is produced with the collodio-albumen, gelatine, gum, and all dry processes which I have tried; I never worked with albumen alone.

It appeared possible that the effect referred to might be produced by reflection from the side of the camera; I therefore long ago made three diaphragms in each compartment, so as to cut off all light from the lens which fell outside the pictures; the halo, however, still appeared.

When the halo is strongly marked, a similar effect is always produced on the edges of all dark objects which project against the sky, making them print more fairly. Even with wet plates, small, leafless twigs, which should be seen against the sky, are often lost in this way. Without so delicate a test as the arrangement in the camera referred to, the fault, if slight, often escapes observation.

With regard to bodies sensitive to actinic light not transmitting it, I believe that all the ordinary sensitive films will transmit strong actinic light if its action be long enough continued. Mr. Moxham's experiments proved this—I forget where they were published, but they were referred to in "Hardwich's Photographic Chemistry," 6th edition, p. 235, 7th edition, p. 350.

I do not mean to assert that all kinds of blurring are produced optically, but that the kind is so which has troubled me with dry plates, and more particularly with tannin plates.

Before writing to you on the subject, I tried some experiments, which seemed to me conclusive. I had long suspected that there might be an optical cause which produced the evil, and on reading Mr. Sutton's explanation I saw at once that it would explain all that I had observed. To test the matter I prepared a film with tannin on orange glass, and obtained a well exposed negative of a subject containing sky and dark objects entirely free from all tendency to blurring. The edge of the sky against the shaded part of the plate was quite sharp and free from all trace of halo. Some common glass plates treated in the same manner, and exposed at the same time, but only half as long, showed unmistakeable symptoms of the fault in question.

I then coated a number of plates of common glass with films varying in opacity, and found invariably that the more opaque the film the less the tendency to blurring.

Some weeks ago I dissolved, by mistake, a very unusually large proportion of iodide in some collodion, with only a trace of bromide; the film it gave was very opaque, and, to my surprise, produced negatives unusually free from blurring; this goes to prove that the iodide does not produce the fault by any chemical action which is restrained by the presence of bromide.—I am, sir, yours truly, C. Russell.

SABATIER BLOT'S APPARATUS, GLYCERINE, AND TRANSFERRING NEGATIVES.

Dear Sir,—I do not see anything in M. Sabatier Blot's apparatus, for taking negatives without a tent, which should entitle it to be called the best adapted for the purpose hitherto invented; much of it is identical with mine, which was published in the News some years since; the only difference seems to me to be that he uses rather a complicated frame instead of my "dark chamber," which is very simple. I do not see how he manages to do away with a "plate box," as he does not appear to carry his plates in the "frame." I have, for many years, used a solution of glycerine in water for keeping plates moist, to save water, and, in addition, I have added two or three drops of glycerine to each ounce of collodion, as it renders the film more adherent, and gives a denser negative. I think if we could obtain a solvent for gutta-percha, which has not the disagreeable smell of benzole, it possesses many advantages over gelatine in transferring negatives. The film readily leaves the glass in water, and it is very durable; and as the gutta-percha becomes a white solid mass when cool, it will keep any length of time, only requiring to be placed in hot water to render it liquid.—Believe me, yours truly,

Thomas Barrett.

Mead Vale, Red Hill, June 14th, 1864.

[The opinion expressed of M. Sabatier Blot's apparatus was that of M. Lacan, who has not seen that of Mr. Barrett; we have never seen anything superior, or even equal, to Mr. Barrett's. Glycerine has, we know, been recommended and used by Mr. Barrett and others for years. But it is sometimes desirable to re-state things which are not sufficiently well known. Gutta-percha is soluble in chloroform; but the chief objection to gutta-percha is that it sometimes seems to decompose with age and break up, and an equal substance of it would be less transparent than gelatine. The durability of the latter has to be tested.—Ed.]

PORTRAITS BY THE MAGNESIUM LIGHT.

Dear Sir,—I am surprised that such remarks as were made by the chairman at the last meeting of the London Photographic Society, respecting my portraits taken by the magnesium light, should be allowed to appear in your report. They are not only unjust, but are wanting in common courtesy. The portrait is not only "described as," but *is*, an excellent one of Professor Faraday, and the same remark applies to the two others named. You have, in a leading article, described those portraits as being equal to what could be done in daylight. This may be true, but I have never claimed any such excellence for them, and it is extremely unfair of anyone, and particularly in a public meeting, to criticise them as if they were taken in daylight, and with all the appliances of the operating room. It must be borne in mind that the portraits of Professor Faraday and Sir H. Holland were done at the Royal Institution, London, the one first named before the audience; and if

"great applause" means anything from a very large audience, it showed that the portraits were not only good, but were recognized and appreciated. As to the one of Professor Roscoe, it is shown as the *first portrait* ever taken by the new *artificial light*, and for no other reason.

I must apologize for troubling you with this letter, but I cannot conceal the annoyance caused by Mr. Glaisher's remarks, having incurred considerable expense, and devoted much time in my experiments for the advancement of this new branch of photography.—Very truly yours,

A. Brothers.

Manchester, June 11th, 1864.

[Mr. Brothers is somewhat hasty in ascribing any want of courtesy to Mr. Glaisher. We feel sure that nothing was further from his intention than any want of justice or courtesy to Mr. Brothers. There was no disparagement whatever expressed to the photographic skill employed. All the remarks we have heard made are complimentary to the excellence of the photographs. In regard to the *likeness* in Professor Faraday's case, we have heard others exclaim either that the portrait must be unlike, or that the Professor must have changed very much lately. To us it appears that the latter is the case, and Mr. Brothers will remember that we expressed a similar conviction to him personally when he first showed us the portrait. It is possible that Mr. Glaisher had no intention beyond expressing a thought which had just struck him, with a view to ascertain if others saw the likeness which he failed to detect; but it is also possible that he might have wished to afford an opportunity for discussing a point of some interest which has not yet been raised in regard to portraiture by artificial light. We refer to the consideration of how far any object, especially the human face, is depicted naturally when illuminated by the diverging rays which issue from a mere point of light. The shape of an object in relief when represented on paper is indicated chiefly by the form of the shadows, and that these should possess the true relation to the original, the object should be illuminated by parallel rays. If the rays proceed from a point of light in proximity to the object, the shadows cast, the rays being divergent, will be enlarged. We are by no means certain that this will exercise an influence appreciably injurious, but it occurred to us that possibly Mr. Glaisher wished to afford opportunity for some such discussion. In any case, we are certain that he is incapable of an uncourteous depreciation of Mr. Brothers' efforts and results, and that no such impression was produced in the meeting as the remarks have conveyed to Mr. Brothers. We repeat our former remarks, that the photographs were excellent.—Ed.]

Photographic Notes and Queries.

Sulphocyanide for Fixing.

Sir,—I saw in the "Answers to Correspondents," in the last number of your esteemed paper, that sulphocyanide of ammonium was not an article of commerce. Now, I have been using nothing else for the last two months. I get it in this town at the *very low price of 2s. per lb.* I think that every one ought to use this salt instead of both cyanide and hypo, as it is an equally efficient substitute for both, is neither poisonous nor unstable, like the two former. Hoping you will give your powerful aid to the introduction of this new and useful salt,—I remain, sir, yours truly, A Newcastle Amateur.

Newcastle, June 9, 1864.

Talk in the Studio.

Lime for the Oxyhydrogen Light.—Mr. J. S. Young states, in the *Philadelphia Photographer*, that having been troubled with imperfect lime, in using the oxyhydrogen light, the balls crepitating and falling to pieces, he tried a new plan of producing them. He threw a piece of Italian marble into a hot fire, and after letting it remain there about twenty minutes it was withdrawn, cooled, and cut into shapes for use. The result was magical: an unsurpassed light, which would continue without failure for eight or ten hours with one piece, was the result.

American Prices.—The photographers of Philadelphia have had a meeting, and agreed to a general increase in the price of photographs to the extent of 50 per cent. The general increase in the cost of the materials appears to be severely felt. Nitrate of silver, it is stated, is selling for 1·75 dols., or 7s. 3d. per ounce, or double the price in this country. On the other hand, alcohol, which is regarded as excessively high at 2·75 dols., or 11s. 5d. per gallon, costs, when pure, double that price with us.

Photographic Exchange Club.—The following are the names of those of our readers who are willing to enter into a mutual exchange of photographs, regulated on a simple basis of good faith towards each other. As one of the modes of preventing disappointment, we recommend each member to commence his exchanges with but one or two pictures, which will enable him to judge of the calibre of the members, and how far their subjects and style of photography meet his taste; the conclusion formed, of course, regulating the extent and direction of future exchanges. As we have before intimated, if members would make it a point to state details of the process used, time of exposure, kind of light, time of day and month, kind of lens and stop employed, a most valuable store of experience and information would be acquired by the members generally:—J. H. Underwood, Beech Cottage, Sale Green, near Manchester, mounted or unmounted stereographs, as members may desire; David Campbell, Folkestone, Kent, mounted stereographs; Thomas R. Lane, Sydney Place, Cork, unmounted stereographs; Marmaduke Walkinton, 7, High Street, Tenby, unmounted stereographs; W. Larchin, Waltham Cross, Herts, unmounted stereographs; Miss Oughterson, Helensburgh, N.B., unmounted stereographs; William Dodgson, West Street, Wigton, Cumberland, unmounted stereographs. We shall from time to time publish additional names forwarded to us.

Acari in the Nitrate Bath. — A correspondent, Mr. Dodgson, of Wigton, says, in a recent letter:—"This afternoon I noticed some minute filiform animalculæ in a sample of collodion I was using. After flooding the plate, and bringing the collodion to one corner for pouring off, I was surprised to see what I at first took for minute filaments of cotton floating in it; and as the plate had been dusted just before, and cleaned with leather only, I examined them more closely, and found they were swimming with an eel-like motion. I think they furnish the clue to the origin of some annoying and hitherto unexplained spots I have been troubled with lately, but which, from their appearance, are apparently caused by the worm, when placed in the bath, curling up in the form of a ring.

What Becomes of all the Photographs?—The Paris correspondent of a daily paper says:—Will somebody, a living note and query, tell me why in a new street the three same trades are always first established? They build quick in Paris, but no sooner is the skeleton of "No. 1, Boulevard de L'Empereur de Mexique," covered with bricks than the Rez de Chaussée is taken for the sale of "canes and umbrellas." No. 2 is pounced upon for a "Magazine of Eatables," and then, as certain as death and quarter-day, comes the inevitable photographist. As for photographs, they are a mystery! Whole parishes must be photographed every day if the "artistic talent of this vast city"—I quote a speech of the Minister of the Beaux Arts—is to be adequately remunerated. Who are all these photographed people? Really, sometimes I am inclined to think that artistic resurrectionists must seize on sleeping men, put them in sacks, take them off on their shoulders, and deliver them to the operator. Perhaps, too, this might account for some of the dead-alive counterfeit presentments which we daily see bound in red and gold and placed conspicuously on the best table.

"Fun" on Photography.—*Fun* makes some far-fetched jokes on photography. Here are two recent specimens:—*Focus Hocus Pocus.*—The Austrian Government has declared photography to be a "trade"—nobody ever considered it an art—and keeps it under the laws regulating the press. "This," says the paper which gives the information, "is a confused proceeding." Why? There's is no camera obscura about the matter to us. Surely there are as many libels—called likenesses—

published by photographers as by newspaper writers. *Motto for the Photographic Society.*—"Distance *lens* enchantment to the view."

To Correspondents.

R. G.—A dilute solution of gum or albumen is frequently applied to prevent films splitting in drying, but whether its presence would interfere to prevent the regularity of the deposit in subsequent intensifying, we cannot say. 2. An acid solution of hyposulphite will not, so far as we know, diminish the intensity of a negative, but if the negative be left immersed sufficiently long, its intensity will be increased by the conversion of the deposit to sulphide of silver, which is black.

HUARAS LIMA.—We do not know the price of M. Sabatier Blot's apparatus. We know nothing further of it than M. Lacan states in his communication.

B. B.—So far as we can understand from your description, there is some imperfection in the glass; we have occasionally met with samples with such a surface, in which case there is no remedy but trying another sample. You say the more you rub the worse is the result: bear in mind that too much rubbing immediately before using a plate is injurious rather than beneficial, both as heating the glass, and developing electrical conditions. We could judge better of the exact cause of these defects if we saw a specimen. 2. You have your figure illuminated too equally all round; the light is too directly in front. 3. The lens has evidently a very curved field, scarcely suited to full-length standing figures. The use of a smaller stop will help you. Your toning bath appears to work very satisfactorily.

IGNORAMUS.—By using a stop you obtain more equal definition all over the plate, and also greater depth of focus. The time of exposure is increased in definite ratio as the size of the stop is diminished. A stop of half an inch will admit just one-fourth the amount of light which a stop of an inch will admit, and will, therefore, require just four times as long exposure. 2. The terms "objective," aplanatic," and "orthographic," as applied to photographic lenses, have been applied by some manufacturers somewhat arbitrarily to indicate certain lenses, the names not necessarily indicating their actual qualities. The *orthographic* lens consists of two achromatic combinations, the front one being a cemented lens, the same as the ordinary view lens, and the back one consisting of a double concave and a concavo-convex touching at their edges. It gives a flat field, and good definition, but the straight lines are rendered curved by it, the curvature being pincushion-shaped, or just the opposite to the curvature given by the ordinary view lens. The *aplanatic* is a single lens, achromatized in a different manner to the ordinary view lens; the alleged object being to reduce spherical aberration. It gives the same kind of distortion as the ordinary view lens. The term *objective* is less specific in its meaning, but has been employed by French makers chiefly in relation to portrait lenses. Without specific meaning of the word is, that lens in a telescope which is next the object to be viewed. The triple lens is a combination of three achromatic lenses, and gives entire freedom from distortion. You have "a large quantity of collodion, which, with the ordinary iodizing, gives such thin pictures as to be useless." What do you mean by the "ordinary iodizing?" Without more specific information we cannot give you any advice.

BUNGLER.—Acidity in the nitrate bath is a common cause of the film slipping off; if your bath is not more acid than necessary, take care to let the film set well before immersion, and see that the films run right up to the edge of the plate all over. With some samples of collodion, it is difficult to avoid. An older sample will probably adhere better.

WALTER WOODBURY.—The presence of a spot of light in the middle of the plate, when using a small stop between a combination of lenses, is sometimes very troublesome. Sometimes shading the lens at the top when it is pointed to a strong light will prove a remedy; placing an annulus of black paper on the inside of the front lens, will sometimes prove a remedy. 2. We have found no difficulty in stripping the tissue from the glass when we have used a thick tough collodion. Should any such difficulty exist, there are two modes of meeting it: one is to rub the plate first, before coating with collodion, with a little ox-gall; the other is to apply the thin film of wax, recommended by Mr. Wenderoth, which you will find described in our last. The mounting of the tissue presents greater difficulty; the india-rubber we have found most successful, but sometimes that does not give us perfect adhesion. Some experience will have to be acquired in order to ensure success. The tissue you enclose is a very good thickness and depth of colour. Mr. Swan makes it, however, just a little thicker. We apprehend that Mr. Swan will have no objection to professional photographers experimenting, so as to acquire skill in his process; it is only when they begin to practise for profit that they must pay.

J. COOPER.—The spots on the print are evidently caused by the picture having come into contact with nitrate of silver since it was mounted, as the spots are on the margin of the card as well as on the print. Either small particles of the salt itself, or being sprinkled by a solution, would produce the effect. 2. For plates up to 7 by 5, No. 6; for larger plates, up to 12 by 10, No. 3.

F. F.—Glycerine has been used in connection with tannin, &c., as a preservative. If used alone, it would keep the plate moist, and so liable to spots from dust, &c., the general evil of the "sticky processes." For preserving the plate moist for a few hours, the strength of the mixture is comparatively unimportant. We are glad to hear of your success with caramel, but should not have expected it to be so slow.

J. N. W.—If the sky in your negative be sufficiently dense to leave the paper white, you will simply have to print in the ordinary way, then masking your landscape, place the white part under the cloud negative and print. The price of the YEAR-BOOK is one shilling. It contains an article on the subject.

J. DAVIS.—We have not seen the brooches containing photographs such as you refer to. 2. Allow your bath to stand a few days in bright sunshine, then filter and add a little nitric acid. 3. There is no secret upon which rapidity depends, except the use of pure chemicals and a good lens. A bath with as little nitric acid as will make it work cleanly, a good bromo-iodized collodion, and strong iron developer, with a lens which gives good definition with a large aperture will give you great rapidity. 4. The sooner a wet plate is exposed, and then developed, the better. In hot weather, if a quarter of an hour elapse between exciting and developing, the plate will frequently be injured. 5. If you shield your excited paper from light, it may be dried before the fire without injury.

C. S.—The spots appear to arise from defects in the paper; but we cannot speak with certainty.

EXCELSIOR.—You have simply to take three grains of chloride of lime, two grains of chloride of gold, and twelve ounces of water, and mix. Leave the solution three or four days, and then use. Should it bleach too much at first, let it stand a few days longer. 2. We have not tried Seller's rolling press, but we believe it answers pretty well. As a matter of choice, we prefer those with a bed of glass or steel passing between rollers.

PHOTO PHILO.—The plate you enclose is a common sample of the fogging frequently obtained with a new bath wanting acid. The safest plan would be to neutralize with carbonate of soda, sun, filter, and then add nitric acid. 2. Your toning bath gives mealiness, probably because you used it too soon after adding fresh chloride of gold.

JOHN.—The defect in the print looks like an imperfection in the paper, caused by something having been drawn over the surface of the albumen before it was dry.

PARVUS.—Anything which will be opaque enough to prevent persons from seeing through the windows of your glass-room from the outside, will also necessarily shut out more or less of light. Probably a solution of epsom salts applied warm, or a solution of gum tragacanth. These will have the advantage of being easily removed, if you don't like the effect.

M. A.—We can scarcely think that the absence of dry-plate pictures in the Exhibition can arise from the difficulty of getting good pictures by these processes, as so many excellent specimens have been exhibited in former years. The mackarel markings are a little uncertain as to their cause; various causes have been suggested, such as the application of hard water before the free nitrate was entirely removed, the tannin solution not having permeated the film perfectly or regularly, the use of a horny collodion, or a collodion too recently prepared, &c.; but we have never met with it ourselves, nor have we any certain information as to the cause. Try the plan of thoroughly washing in distilled water before and after applying the tannin. The black spots look as if they arose from want of filtration in the developer, or from some actual abrasion in the film. The view marked No. 1 has many charming points, and with a little skilful doctoring of the sky would make a very pleasing picture.

PERSPECTIVE.—If a lens of very short focus be used, there will be an unnaturally rapid diminution of retiring objects. In order to form the most correct estimate of the relative size and distance of objects in a photograph, the picture should be held at the same distance from the eye as the stop of the lens was from the plate, and it should be, if not stereoscopic, examined with one eye. The especial form of the lens will not affect the question. It is nevertheless true, that the eye itself is apt to be deceived. In looking at the hills to which you refer, your knowledge of their magnitude will probably make them appear relatively larger to the eye than true perspective would render them. Of this you may easily satisfy yourself: coat a piece of glass with a solution of gum, and then examine the view through this, and without moving the eye, roughly sketch the size of the distant objects, and of some foreground object, on the gummed surface. This will afford you a standard of comparison to judge how far your photographic perspective is from being accurate.

W.—There is no work published in this country specifically devoted to card portraiture. You will find the fullest information on the process employed and mode of proceeding in our YEAR-BOOK for 1864.

J. BELDON.—We have forwarded the prints. Please let us know what numbers you have to dispose of.

A. CARR AND J. MILLER.—You can send them to our publisher on sale, if you choose.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. SAMUEL JAMES WISEMAN, 15, Above Bar, Southamptou,
Two Photographs of the English Eleven Cricketers.

MR. JABEZ JONES, Market Drayton,
Three Photographic Views of Adderley Hall, near Market Drayton.

MR. JOHN WALKER, Blackpool, Lancashire,
Photograph of Blackpool Pier.

MR. J. PENDER, 5 and 6, George's Street, Waterford,
Photograph of Dunbrody Abbey.

MR. F. TREBLE, Catherine Street, Salisbury,
Photograph of Interior of Sherborne Abbey, looking East.

MR. J. W. FALL, Market Square, Ironbridge, Salop,
Two Photographs of Mr. Joseph Faulkner.

MESSRS. SIMM AND FORRESTER, 36, Renfield Street, Glasgow.
Photograph of Marble Statue—The Blind Boy.

MR. G. R. FITT, 100, Regent Street,
Photograph of Dr. George Burrows, F.R.S., President of the Medical Council.

MR. E. GOSHAWK, Harrow,
Two Photographs of Dr. Vaughan, Doncaster.

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All Communications for the Editor to be addressed to 32, PATERNOSTER ROW.

THE PHOTOGRAPHIC NEWS.

VOL. VIII., No. 303.—*June* 24, 1864.

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THE POISONOUS QUALITIES OF BICHROMATES.

AT a period when the chromic salts are used somewhat extensively by experimentalists, and still more especially when it is probable that they may come into general use in the everyday practice of many photographers, it is desirable, perhaps, to say a word or two about one of their qualities but little known, and not usually referred to in books appertaining to photographic chemistry, or, indeed, in manuals of chemistry generally: we refer to their toxical qualities. Let it be distinctly understood by our readers, however, that it is rather with a view to enforce caution in dealing with a poisonous agent than to excite fear of danger. When the properties of any body are well understood, there is little danger to be apprehended from its proper use. The poisonous qualities of cyanide of potassium being well known, the photographer guards himself from its injurious action. Bichromate of potash appears to be in many respects only second to cyanide in its injurious action, and it becomes not less important that equal care should be exercised in its use.

From a report published some time last year, by Dr. Cloet, in the *Annales d'Hygiene*, on the occasion of an investigation as to the causes of the deteriorated health of the workpeople engaged in a bichromate manufactory, we learn that, at times, most disastrous results arise from its action on the human system. Taken internally, it is not poisonous in such minute doses as cyanide, about fifteen grains being necessary to cause death in a healthy adult person; but it is in coming in contact with the mucous membrane, or with a slight abrasion of the skin that its most injurious action is found, obstinate and dangerous ulcerations issuing occasionally in complete destruction of the part, ensuing. It is to be observed that when used with care, no danger whatever need be apprehended, as it is quite innocuous on the skin when there is no abrasion, no absorption of the poison taking place, except by the mucous membrane, or through a wound of some kind. The important point for photographers to observe is to avoid contact with the bichromate where there is any scratch or lesion of the skin, and to avoid contact with the eyes or nostrils with fingers which have recently touched the chromic salt. We subjoin an extract from Dr. Cloet's report, referring to the injuries induced, the treatment necessary:—

"This salt (bichromate of potash) in small doses, say a few grains, acts as a purgative; if in larger doses, say fifteen grains, it acts as a poison. A workman in a factory put some bichromate into a barrel of cider, by way of joke. The cider was rendered dark in colour, but still the other workmen drank of it, and were all affected with severe colic and diarrhœa. Disease of the nostril has been produced by workmen who, having stained their fingers with the salt, have put them into the nostril.

"In transforming neutral chromate of potassa into bichromate, by means of acid, the vapour arising carries with it a infinity of pulverulent molecules of the product, which spread through the workshop. This cloud of particles is easily visible in a ray of sunlight. The molecules inspired give a bitter and very disagreeable taste to the palate; but as profuse salivation is the result, the chromate is thrown off in the saliva, and has not time to inflict any permanent injury. If, however, respiration be made through the nose, the molecules are dissolved in the layer of secretion which lies on the membrane, creating a violent pricking, suffusion of tears, and irresistible sneezing. In time, the membrane begins to be thrown off, and portions of it are carried into the handkerchief used in blowing the nose; this process, when once started, goes on so rapidly, that after a period of six or eight days the septum becomes thin, permeated with openings, and is ultimately detached altogether. Snuff takers escape this evil.

"On the skin, in its normal state, and intact, the bichromate exercises no baleful influence; the hand may, in fact, be plunged into a hot concentrated solution of the salt, without fear; the hand may also be covered with the salt for an entire day, without any observed effect; but if the skin is torn or abraded, however triflingly, by the prick of a pin for example, a sharp pain is felt on contact of the salt, and if it be left in contact with the wound, the caustic character of the salt is brought out intensely, the cutaneous tissue is decomposed, and violent inflammation is established. These symptoms are accompanied with intense pain, especially in winter, when the cold is severe; the action of the salt does not cease until the cauterization has penetrated to the bone.

"When the skin is abraded, and the bichromate has produced ulceration, the best treatment is to wash the part thoroughly with a feebly alkaline water; then, if inflammatory action follows, to poultice, and afterwards freely apply subacetate of lead in solution."

We may add that whilst it is the bichromate of potash which is here especially referred to, it is probable that the same physiological effects would arise from the action of other combinations with chromic acid.

PHOTOGRAPHIC ENAMELS.

WE have recently had our attention called to some meritorious experiments in the production of photographic enamels, made some time ago by Mr. Robert Freeman Barnes, a gentleman whose name was associated with some of the early and successful dry collodion experiments. We regret that the amount of information before us at present as to the details of the experiments is but meagre, but the results are interesting, and we hope to be able to publish further particulars at a future date. We are indebted to Mr. Abbott for a sight of the results, and for such information as we

have on the subject. We may as well give here Mr. Abbott's last letter referring to them.

Sir,—Mr. Barnes is so retiring a man, and of so few words, that it must be from my own inquiries and observations on the manipulations of his enamels that I write to you.

His experiments on photography have extended over twelve years, and I have had much pleasure, from time to time, to see the development of his talent.

It was from the knowledge of his retiring habits, and his dislike to anything like putting his discoveries forward, that induced me to ask his permission to allow me to place his specimens of enamels before you. I did this, in justice to his merits, in order to show you that one in England, without any knowledge of Camarsac, or his process, had arrived at the same results as the Frenchman; but though Mr. Barnes is convinced that his process is complete, yet he feels that time alone will enable him to produce more finished specimens than those I left at your office, which I marked as *three* distinct steps of progress.

The large convex oval enamel, with two heads, was produced by collodion direct in the camera from the negative, developed and submitted to a strong solution of hyposulphite of gold, which is precipitated upon the image and rendered very dense. The picture is then washed, and when dry, submitted to the vapour of iodine, for the purpose of converting the silver part of the image into the iodide of silver; it is then cleared in a solution of hyposulphite of soda, and again washed, dried, and submitted to the vapour of mercury, to take up an enamel colour, on the principle of colouring daguerreotypes, the object of which is to produce the picture in gold, assisted by a suitable enamel colour, then it is ready for the furnace.

The second step gave the brilliant pictures on the flat enamels, which are printed and produced by albumen and gold, and although permanent and beautiful, will not stand the furnace so well as those of the first step. This process must remain an independent one, as it is, without being vitrified.

The third step gives the convex vitrified enamels. The manipulation is somewhat difficult; a film is used on the convexity, and Mr. Barnes is now aiming to simplify it.—I have the honour to be, my dear sir, yours very faithfully,

James Abbott, M.A.

Brunswick Cottage, Rokeby Road, Upper Lewisham Road, Deptford, May 30th, 1864.

The first described group of two heads, is of a light warm brown tint, with a somewhat metallic appearance of a golden and purple character, but the images are wanting in force. They are not regarded by Mr. Barnes as successful.

The second series is very interesting and pleasing, but the pictures are not enamels. They are brilliant and pleasing pictures printed on albumen, on a white enamel ground, having all the appearance, and probably might serve most of the purposes, of genuine enamels.

The third series, regarding which we have no information beyond what is furnished in the paragraph above, appears to possess much promise. There are three specimens, each of a different tint, and each somewhat faulty in this respect; but they are genuine vitrified photographs, with good gradation, and a fair amount of vigour and force. One of them is of a light chocolate colour, but yellowish in the whites; another of black tone, but slightly pervaded with a greenish yellow hue, both in light and shadow. The third is of a grayish brown tint in the shadows, and quite pure in the lights. These pictures, doubtless, possess much promise, and we shall be glad to hear of Mr. Barnes' further success, and to know something of the direction in which he is working. Our own impression is, that Mr. Swan's process affords the highest hope of success, and we are inclined to believe with Mr. Tunny, that Camarsac's process, by which the most successful photographic enamels have been produced, is based on a similar principle. We shall be glad to learn the results of any application of Mr. Swan's process to enamelling.

The steel plates of rolling presses belonging to amateurs should, when not in use, be covered with a solution of bees'-wax to protect them from rust. It is very easily applied, and very easily removed again, when necessary.

THE PHOTOGRAPHIC EXHIBITION.

STUDIES AND GENRE SUBJECTS.

We had hoped, before this time, to have announced the award of medals for the best examples of different kinds of photography, according to the conditions laid down by the council of the society. It appears, however, that the Committee of Adjudication have not yet been able to arrive at a decision, owing to a serious difference of opinion on some points of merit. Without entering further into the question here, we may remark that, notwithstanding the stringent prohibition of retouching, the duty of adjudication has been rendered much more onerous, by the fact that retouching has been applied to many of the best pictures, and that in a most gratuitous and unnecessary manner. The practice, in some cases, of retouching, effected in an almost imperceptible manner, seems to have begot suspicion in other cases; and we have received a remonstrance, which we publish in another page,* charging us with having highly lauded, in our first notice of the Exhibition, pictures which owed much of their excellence to skilful retouching. As we have appended a note to the letter to which we refer, it is not necessary to dwell on the personal question here; but we may take occasion to ask is it not a singular circumstance that photographers should be so ready to believe that when photographs excel, especially in the highest photographic qualities, this excellence is due to the pencil of the "retoucher?" Retouching to remove blemishes we consider not only legitimate, but praiseworthy, at least in work not entering into competition as "untouched;" but as for working upon a photograph and covering it up with black and white, we have never seen an instance which was even tolerable, in comparison with a really perfect photograph without such questionable aid.

The studies or *genre* pictures in this year's exhibition, whilst not very numerous, bear their full proportion to others, when the limited extent of the exhibition is remembered. There is nothing from Mr. Rejlander and some others who have exhibited this class of pictures in former years, and in combination pictures there are no new competitors, the field being solely, and, fortunately, very worthily, occupied by Mr. H. P. Robinson.

The chief compositions he exhibits we have already brought under the attention of our readers. Occupying the place of honour in the exhibition is the fine composition representing gleaners and an autumnal landscape, entitled "Autumn," which is, in all respects, one of the most charming photographs we have ever seen. The copy in Pall Mall is not, possibly from some haste in getting ready for the exhibition, as perfect a print as we have seen, the foreground group of figures wanting a little force; but the landscape is perfect. We have rarely seen a photograph in which every plane of distance is so admirably rendered, carrying the eye into the far-off hazy region, where brook and trees and sky meet, and cease to have any other form or colour but that of "distance." In photographs, we have been too often reminded of Canova's remark of West, when he said, "*Il ne compose pas, il met des figures en groupes.*" In photographs generally we have too often seen the "figures put into groups," instead of composition. In Mr. Robinson's pictures, generally, and in "Autumn" particularly, we have no trace of this fault: the composition is admirable, even as a series of masses and lines; every figure takes its place in completing the balance, and plays its part in perfecting the harmony. The same remarks are true of his "Somebody Coming:" taken simply as a study of chiaroscuro, and viewed in the twilight or with half-closed eyes, it is a wonderfully perfect composition, whilst for the skilful rendering of an idea, and for perfectly detailed and, at the same time, brilliant photography, it is most admirable. "The May Gatherers" is a fine large vignetted picture, formed of the principal group from "Bringing Home the May," and illustrates the excellence of a part when judiciously taken

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* See page 311.

from a perfect whole. "The Interior of a Study," No. 85, might possibly be properly classified under the head of portraiture. It consists of a noble and admirably characteristic portrait of the artist himself, who, with his head resting on his hand, is seated at a table reading. The furniture of the study is antique throughout: a carved oak book-case is behind the student, who is seated in a quaint old chair, before a carved oak table. The principal portion of the background is formed by one side of the room hung with a piece of fine old tapestry, depicting the story of *Mordecai*. Folio volumes are strewed about the table and floor in "most admired disorder." A portfolio resting on a low easel, is partially covered with a piece of rich drapery which has been drawn carlessly aside, but which falls in admirable lines for aiding the composition. The somewhat sombre effect of an interior with heavy antique accessories, is relieved by a stream of light coming from an unseen window, illuminating the tapestry and falling upon the head of the student. As a study of composition and chiaroscuro, it is a grand picture, and not less perfect as a fine specimen of unconventional portraiture. It is high praise that by artists it is especially admired, and generally regarded at the first glance as a copy of a painting. It is to be remarked, however, that there is nothing theatrical about this picture; the sitter is not masquerading in the slashed doublet of a cavalier, or the cowl of a monk; the artist has not felt it necessary to have recourse to the fripperies of the costumier to avoid the common-place, or the dead level of conventionalism; but in the lounging costume of an English gentleman, with an interior such as may be ound in scores of English mansions, he has produced a photograph which is valuable for its art qualities as a picture to any lover of art, and invaluable as a portrait to those who know and esteem the original.

Viscountess Hawarden contributes a few of her charming studies this year, but we regret that they are so few. They possess all the peculiar beauties which have distinguished her ladyship's former contributions, and are of their kind altogether unrivalled. The largest, a picture about 10 by 10, No. 187, is a most charming picture, surpassed by nothing in the exhibition; it consists of a graceful female figure in rich drapery, standing beside a window, the full light from which falls upon one side of the drapery without producing chalkiness or destroying detail; whilst in the deep shadow produced by the intense direct light on the other side of the figure is so exquisitely transparent that no detail is lost or any approach to blackness apparent. The pose and arrangement are graceful and artistic, possibly a little more reflected light on the face seen in the mirror would have been an improvement, and a more flowing or sweeping line in the drapery where it cuts the light would have been better. But the picture is altogether charming notwithstanding. Lady Hawarden exhibits a few smaller studies having similar characteristics, graceful arrangement, and unusual and extremely artistic lighting, great transparency, and much tenderness and delicacy of treatment.

Mr. Henry Cooper, jun., has struck out a line for himself, in which he has produced very perfect results. His pictures consist chiefly of portrait studies, and are distinguished by freshness and grace of arrangement, very judicious and effective lighting, and a delicate and pure style of photography. Some of his pictures are as perfect as anything we have seen in photography. An old lady, in frame No. 39, is wonderfully charming. Besides the excellence of his photography, Mr. Cooper has devoted especial attention to the very effective style of double printing which he has described in our pages, by the judicious management of which the value and beauty of many of the pictures is enhanced in a degree which must be seen to be appreciated. To state that his pictures imitate fine chalk heads on a tinted ground, is to compliment the crayon picture rather than the photograph.

Mr. J. Hubbard exhibits a series of simple studies of female figures, some of which possess much merit and display fine feeling. In one or two instances the vignetting or accessories repeat the line of the figure with an exactness that is a little formal.

Messrs. Ross and Thompson exhibit a variety of very pretty studies in regard to which we have one constant regret, that there is throughout a prevailing tendency to heaviness and sombreness of effect, possibly from over-printing and black toning. This is the more to be regretted because so much good photography and fine feeling thus lose half of their legitimate effect. Their subjects display considerable graceful fancy and skilful arrangement, and, with a little more light and transparency, many of them would be very fine indeed.

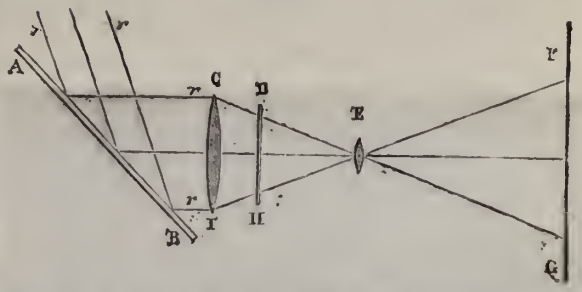
There are a few more noteworthy studies, notice of which we must defer for the present.

ON A NEW DIALYTIC APPARATUS FOR THE ENLARGEMENT OF PHOTOGRAPHS.

BY DR. VAN MONCKHOVEN.*

The solar camera of Woodward is now familiar to photographers generally. A reflector, AB (fig. 1), throws the

Fig. 1.

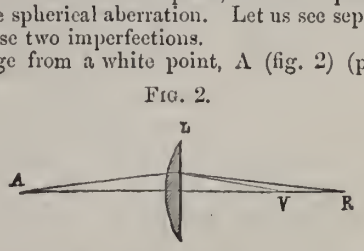


solar rays, *rr*, upon a large lens, CI, which brings these to a focus at E, at which point an achromatic lens, single or compound, is placed. Through the negative, DH, the solar rays pass, and the enlarged image is projected upon a sensitive surface, FG.

Now, this apparatus is not perfect. At the outset, the lens CI, is not achromatic, and the circle of light, FG, is fringed with colours. In the next place, this lens possesses very considerable spherical aberration. Let us see separately the effect of these two imperfections.

The image from a white point, A (fig. 2) (placed at a

Fig. 2.

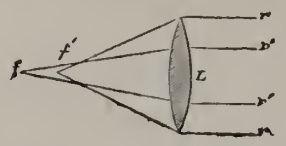


great distance from a converging lens, L, and upon its axis), formed at the principal focus, R, lacks clear, sharp definition, because it is surrounded by a violet fringe or halo. At V, nearer to the lens, this image is surrounded by a red halo. This arises from the fact, that refraction of light is accompanied by decomposition, and that the focus, V, of violet rays, is nearer to the lens than the focus, R, of red rays. But a sensitive surface placed at V, will give an image of the point A, despite the halo of red rays which are seen to surround it, because it is sensitive to the blue and violet rays only, which there come to a focus. The result is then the same as if the point A only emitted blue or violet rays. The condenser of Woodward's solar camera need not then be achromatic, for the sun only acts by the actinic rays, and the apparatus is practically blind to all the others.

* Read before the French Photographic Society, June 3.

Let us now examine the effect of the spherical aberration. When the luminous rays emanating from a distant point, from the sun for example, fall perpendicularly upon a biconvex lens, L (fig. 3), the focus, f', of the extreme rays, rr,

FIG. 3



is nearer to the lens than the focus, f, of the central rays, $r'r'$. It is easy to give to this lens such curves as will reduce this aberration to a minimum, but it cannot be entirely destroyed, especially, as is the case here, when the diameter of the lens is from one-half to one-third of its focal length.

If we use a lens similar to that of Mr. Woodward, we shall observe at once that the field of illumination is very unequal, for the edges of the negative are much more illuminated than the centre, and as the edges are coloured by the red light arising from chromatic aberration, they are just those rays which we leave to fall beyond the sensitive surface. We lose, then, a great part of the advantage of using a large lens for concentrating the light. But this aberration has one consequence most disastrous. Let L (fig. 4) be the

FIG. 4.



condenser, and in an even plane passing by the axis, MN, two pencils or parcels of solar rays, the one, r, which falls upon the edges, and the other, r' upon a central part. The small lens, E, is placed at the principal focus of the large one. Now it is apparent that the rays r, are, when falling upon E, converging, and the rays r' are diverging. We further remark that a like point, a, of the negative, DH, to be enlarged, situated upon the edge of the negative, is traversed by two pencils, one proceeding from the centre of the condenser, the other from its edge. The lens, E, acts then, not by one point from its surface, but by two, which are moreover very distant, in forming the image a' upon screen, FG: thus this image is confused, because the emergent pencils which meet at a' are not concordant. A diaphragm placed in front of the lens, E, cuts off the rays which proceed from the edges of the lens, L; but it is only as if the condenser were reduced, so that the central portion only were in operation, and there is not sufficient light to produce the enlarged image on the sensitive surface.

When the condenser, L (fig. 4), has a diameter of not more than seven or eight inches, when we place the lens, E, at the focus of extreme rays, at DH, for instance, and when, besides, the negative is not less across than three or four inches, then the spherical aberration does not interfere much with the sharpness of the image, but the process of enlargement requires many hours on account of the insufficiency of light. But as soon as we use condensers of twelve inches diameter and upwards, then the spherical aberration becomes considerable, especially if the negative be not larger than a *carte de visite*, which has just the dimensions most favourable for securing a perfectly sharp negative.

(To be continued.)

SOME REMARKS ON MR. WENDEROTH'S METHOD OF TRANSFERRING NEGATIVES, AND ON THE NEW CARBON PROCESS.

BY H. COOPER, JUN.

I HAVE lately been experimenting with Mr. Wenderoth's method of transferring, and having succeeded perfectly, I can recommend it with great confidence to your readers. At first, it was thought by some, that if the coating of wax facilitated the removal of the collodion film, that the latter would be in great danger of coming off before it was wanted to do so. To test this point to the utmost, I took several glass plates very imperfectly cleaned, and having applied the wax, coated with a sample of collodion that has always given me a good deal of trouble, by becoming detached from the glass in washing, &c.; having exposed and developed, I scratched the film several times right across, then fixed and washed under a violent stream of water, without the collodion showing the least tendency to separate.

I was so much pleased with the success of this experiment, which I repeated with several different collodions, that I intend to adopt the coating of wax for constant use, the immunity from stains being also a great advantage; though I need hardly mention that in practice the glasses must be cleaned sufficiently not to contaminate the nitrate bath.

Another incidental advantage is, that a number of plates may be prepared on a dull day and stacked away for use, as there is no danger of the surface getting damp and streaky as unprotected glass would do.

I found it useful to *slightly* warm the glass after pouring on a few drops of the etherial solution of wax, it being much more easy and expeditious to smear the wax evenly over the surface than when the plate is allowed to remain cold, as in the latter case some amount of friction has to be applied before the wax can be got into a condition to produce an equal coating.

Some negatives that I had left unscratched, I then transferred on to gelatine; which operation I found exceedingly simple and safe.

It may be remembered that when trying to transfer negatives *without* using wax, I met with some very annoying and curious results, such as the splitting of the collodion film, &c.

In the carbon process, after repeated trials, I have come to the conclusion that the best method of mounting the tissue for development, when not intended to be transferred, is to adopt the method described by Mr. Henderson, in the PHOTOGRAPHIC NEWS, May 20th:—Moisten the *back* of a piece of albumenized paper, by laying it on a pad of wet blotting paper, and when the surface has become tacky, press the tissue on it, of course taking care that no air-bubbles intervene; if the tissue be thick, breathing slightly on the gelatine side will prevent its curling when placed on the damp paper; whilst moist (but not *wet*), saturate the paper with strong methylated alcohol, by passing a sponge dipped in that liquid over the back of the paper; it is as well to prevent the spirit touching the gelatine surface. The alcohol will coagulate the albumen and cause it to hold the tissue and paper so firmly together, that under any amount of washing I have not observed the least tendency to curl up at the edges, or separate. This mode is so much more safe, pleasant, elegant and clean, that I am sure experimentalists will only have to try it once to adopt it.

I would advise all your readers who are troubled with insoluble films to keep on reducing the quantity of bichromate, as I find that, during this warm weather, from thirty to forty parts of gelatine solution to one of bichromate, are the best proportions.

I also find that glycerine in the proportion of ten drops to the ounce of gelatine solution is far preferable to sugar.

One of the great drawbacks to the practical and commercial value of Mr. Swan's process is the difficulty (or rather impossibility) of preparing tissues by it that could be sensitized as wanted, the same as we now do our silvered paper. A

sheet of gelatine can be rendered sensitive by immersing it in a solution of bichromate, but upon subjecting a tissue prepared after Mr. Swan's method, to the action of a liquid, it will curl up in every direction, telling us as plain as possible that it is "no go trying that dodge." Mr. C. K. Wild, of Messrs. Reeves and Sons, has invented an ingenious modification of the original process, which will, I hope, with some few alterations, be found of great value. At present I can only give your readers a rough outline of the proposed *modus operandi*, but trust next week to give a more detailed account.

Mr. Wild, being desirous to place the idea as early as possible in the hands of photographers for experiment, as he has no convenience for carrying out photographic operations, I promised that I would introduce the subject in this short article. I ought, in justice to the process, to state, that Mr. Wild has produced a few pictures by it which are very encouraging; to show that it is not a mere fantastical idea, but one likely to be of practical value.

Take a sheet of paper, the thinner the better, and coat it with pigmented gelatine, same proportions as for Mr. Swan's process. The gelatine need not be very thick on the surface of the paper, so that it is soon dry, it taking only two or three hours to complete that operation.

Now there are two ways of coating the paper—first, by floating on a dish of warm gelatine solution; and second, by the method adopted by the persons who glaze the surface of prints, &c., with gelatine. The latter method would produce the most perfect results, and would, I apprehend, be the most simple and easy of application on a large scale. I must delay the *minutiæ* of this part of the process till it has been carefully experimented upon. These sheets of paper, coated with coloured gelatine, will keep an indefinite time if placed in a dry atmosphere, and might be prepared and sold in the same manner as albumenized paper at the present time. To sensitize it, float gelatine side down, for a minute or so on a solution of bichromate of potash or ammonia, strength about 40 grains to the ounce, and containing from 5 to 10 per cent. of alcohol; the use of the latter is to cause the solution to permeate the gelatine more evenly and quickly. Some further trials are necessary to determine the requisite strength, as too strong a solution would tend to render the film insoluble, and one too weak would necessitate longer printing.

When the paper is dry it is to be exposed under a negative, the printing *not* to be effected *through the paper*, as in Mr. Pouncy's process, *but on the surface in the ordinary way*. When removed from the pressure frame it is to be mounted face downwards on another piece of paper, with india-rubber, or by the method recommended and described above. Upon placing it in warm water the paper that was originally attached to the gelatine will come away, allowing the parts that remain unaltered by light to be washed off, and as the water acts upon the side *not printed upon*, the half-tone will be fully preserved. To ensure success, the paper, before applying the gelatine, should be coated with a solution of starch, sago, tapioca, or other suitable gluten easily soluble in *warm* water, in the same manner as the decalcomanie sheets are prepared.

The experiments have as yet been very rude, so that we cannot form any correct idea of the capabilities of the process I have attempted to describe to your readers; I sincerely hope that a good number will at once set to work, and soon bring this elegant modification to a successful termination. In conclusion, I must state that Messrs. Reeves have, after an immense number of experiments, produced, ready for sale, a pigment that is perfect in every respect.

Since the above was in type, Mr. Cooper has received the following letter from Mr. Wild:—

"In consequence of the hints you gave me yesterday, I felt anxious to try my experiments over again; so, in the afternoon, prepared some paper with a solution of dextrine, and on that the coloured gelatine; this morning, I floated the paper on a weak solution of the bichromate, and printed a few positives. After three to five minutes' exposure, I mounted the print on albumenized paper, coagulating it with spirit, as you told me, and found it answer first rate, the results being quite beyond my expectation; after mounting, I soaked for a few minutes in cold water, when the original paper came away easily, and the prints stood any amount of washing. The proofs are very much better than the two I gave you, and the tone very good. I printed, mounted, and washed six in two and a half hours, so that it seems to me a very expeditious method. I write you these few lines thinking you might like to add it to your paper; and if you are passing our way to-morrow, I shall be happy to show you the result. They are not quite dry yet, or I would have put one in this.

HOW TO PREVENT FOGGING. HOW TO RESTORE A FOGGED COLLODION POSITIVE OR NEGATIVE.

Fogginess on a collodion picture depends upon several causes, as, for instance, on the neutral or alkaline condition either of the nitrate of silver bath or of the collodion itself, or the condition of the developer, or the imperfections of the glass surface and its want of absolute cleanness, or the time of exposure, or imperfections in the camera, the dark-room, and the plateholder; finally, on the fixing solutions.

In the first place, then, in reference to the first cause, receive the following instructions:—

Ascertain, by means of reddened litmus paper, whether the silver bath has an alkaline reaction, which is shown to be the case if the paper, after an hour's immersion, turns bluish. If this be so, or even should it not be so, it is advisable (especially if the bath is old) to boil the solution with a grain or two of oxide of silver for a quarter of an hour or longer; after it is cool, filter through a piece of moist bibulous paper, and add a drop of glacial acetic acid for each four ounces of the solution, if it is intended for negatives, or the same amount of nitric acid if the bath is to be used for the preparation of ambrotypes. Should fogging still set in after proper exposure, add more acid. This, however, is not, under ordinary circumstances, to be expected.

Secondly, the collodion itself may be the cause of fogging. A colourless collodion made with the cadmium salts alone is very apt to produce this effect. A little tincture, either of bromine or iodine, prepared with absolute alcohol, and added to the collodion, will generally be found to be of great service in preventing fogginess. We regard it as a better expedient to doctor the collodion for this evil, than to trifle with the bath; above all things, add no alkali to the bath, even if it should be acid; but observe the rule recommended, and use oxide of silver.

Thirdly, the developer may be too powerful and thus reduce the silver solution to pure silver. The remedy here is to add more acetic or other acid, which retards the energy of the developer and thus makes it more manageable. In summer much more acid is required than in winter. Keep the developer perfectly clear by filtration, make it fresh every day, use it only once, and preserve it in a stoppered bottle.

Fourthly, glasses that have been frequently used, and sometimes new glasses, retain on their surface certain metallic deposits, &c., deposits which institute fogging in spite of almost all known means of prevention.

The rotten stone with which the plates are cleaned sometimes contains metallic impurities which superinduce the evil in question. If the glass is new, clean it thoroughly by washing in pure water and by drying with clean cloths. This is the simplest, easiest, and cheapest method. If the plates have been used before, clean off the collodion film by any of the ordinary methods, and then immerse them in a bath of water made sour by nitric acid, which will combine with any metal that may be present on the surface of the glass, and thus dissolve it.

Finally, wash the plates in pure water and dry as before. Now that alcohol is so dear, this plan is to be highly recom-

mended both for its effectiveness and for economy's sake. Pile the plates, when clean, in juxtaposition but with no paper or other material between them. Keep them in a place free from dust and effluvia of every description.

Too long an exposure either to light or to the developer is sure to produce fogging. The remedy is plain.

The imperfections in the camera, in the dark room, or in the plateholder, consist essentially in apertures, cracks, &c., through which light can penetrate. See, therefore, that no light can enter but that which is needed, and where needed. It is a very common occurrence that light reaches the collodion film when the slide is in the act of being drawn out. In landscape photography especially this is to be carefully guarded against by placing the focussing cloth over the slide when it is drawn out or again inserted.

Finally, cyanide of potassium is a reducing agent proper, and is apt to produce fogging sometimes after the picture has become perfectly clear. The fogginess consists of reduced silver. Hyposulphite of soda, when decomposing by means of acids, &c., liberates sulphur compounds, which are instrumental in destroying the transparency of the picture. Use both of these solutions fresh every day, and even fresh every time when applied. Success is then certain. Still, failures do not always occur when the solutions have been used over and over again.

These are the general causes of fogging.

We will suppose, however, the picture has been fogged by over-exposure, too powerful a developer, or a developer too long applied, or by exposing the plate before fixing or before the latter is complete, or, in fine, by either of the fixing solutions themselves. The picture is, in fact, good, but suffused with a universal haze that destroys its beauty and transparency. What is to be done?

Add a few drops of tincture of iodine to a drachm or two of water, shake quickly and flow the fogged plate with this solution. The collodion film soon changes colour; the silver, which forms the picture, becomes converted into the iodide of silver, which is now soluble in the fixing solutions. By this means the cloud becomes dissolved and the picture is rendered perfectly transparent in the lights. This operation requires caution, otherwise the complete picture may be dissolved and nothing is left.—*Humphrey's Journal.*

THE SCIENCE OF A RAY OF LIGHT.*

What is light?

Whence its immediate origin?

What its properties?

By what organs are we made cognizant of it?

By experimentation and observation we derive a general answer to the first question—what is light?

It is visible heat.

Experiment No. 1.

In the darkest night, and in the most tenebrious nook, with steel, tinder and flint, strike a light! By the concussion, the compression of the oxygen between the flint and the steel, a small piece either of the flint or steel is made hot; this particle communicates its heat to the tinder, and renders it incandescent, and the tinder, in its turn, sets fire to the brimstone match, and produces flame, which is the candescent vapour of matter.

Experiment No. 2.

Let us now take the fire syringe; the piston contains within the cylinder at its end a small piece of amadon. We will compress the air in the cylinder to a very small compass, whereby the heat among the particles or atoms of oxygen is, so to say, pressed out; that is, technically the latent heat is thus rendered sensible, which, acting on the amadon, makes it red hot.

Experiment No. 3.

Take an ordinary lucifer match, and, rubbing it on a rough surface quickly, so much heat is generated—so we say generally—as to set the phosphorus on fire; that is, the phosphorus is first made incandescent, then the vapour of phosphorus is produced, which enters into flame; this renders the sulphur beneath incandescent which in its turn produces the vapour and flame of this body; this flame finally heats the carbon of the wood and of the constituents of wood to candescence; some of these constituents are volatile and produce vapour, which the heat renders incandescent.

Experiment No. 4.

Pass a current of electricity through a fine platinum wire; the latter becomes heated to incandescence, and so does any other metal; or pass it through two charcoal points; the same incandescent heat is observed, which can be verified by putting the finger in the flame.

Every instance of burning, without exception, where flame is produced, presents an example of matter emitting light.

The universality of this expression or law does not comprehend, however, that light must necessarily be always as hot as incandescent heat; but the second law of light is equally universal—There is no light without heat; for the light, from whatever source obtained, if it can be obtained in sufficient quantity, can always be so far condensed into a less compass as to manifest heat. Witness, as an example, the concentration of light by a convex lens, or the thermal increment when a thermometer is placed in the red rays of the solar spectrum.

The third law of light is the following:

All light can be traced either to a heated or phosphorescent body; and that, when the heat or phosphorescence in a given source ceases, the light from the same source will also cease to be emitted.

It may be remarked by the refined physicist, that most of the definitions here brought forward are the mere enunciations of the source of light, and not of light itself. Admitted. We know nothing either of gravity or light when separate from matter. All the fine-spun theories about undulations, or of motion in an immaterial ether, are the cobwebs of absurdity, and lead us finally to admit that the advances in the science of nature have not, in a single instance, given us the clue to creation, or created matter, or force. We are thus driven back to where we began, and we are glad to have something to fall back upon in the midst of so much dogmatic and learned nonsense; and God said: Let there be light, and there was light.

And pray, what is heat?

The natural philosopher can no more define, by one single, simple, and comprehensive definition, what is meant by heat, than the chemist can define what is meant by the word oxygen.

The chemist says:

Oxygen is a non-condensable gas.

But there are other non-condensable gases; besides, what is a gas?

Gas is *matter* whose particles are separated far apart by *heat.* Hence, what is matter? What is heat?

Furthermore, says the chemist, oxygen has a specific gravity of so-and-so much; it is transparent, a supporter of combustion, tasteless, inodorous; when in combination with other bodies it occupies less space than before combination; when it enters the living tissues it parts with its latent heat; by means of heat, electricity, or spongy platinum, it forms an explosive mixture with hydrogen; and other properties and epithets, &c. &c., almost *ad infinitum.*

Now these enunciations merely characterize the various properties, changes, or functions of the substance called oxygen; they do not define what it is, but the characters which it possesses and what it does. All similar attempts at definition of natural objects invariably reduce us to the final definition of matter, heat, light gravity, and electricity; and when thus reduced to the limits, the bounds between that which is and its Creator, we may as well confess at once our inability

* From *Humphrey's Journal.*

to, proceed a single step further, and acknowledge our ignorance.

What is the origin of light?

Every object, every variety of matter that enters into combustion or phosphorescence by whatever means, or becomes incandescent, or enters into flame, is an original source of light. As far as human knowledge extends, there is no other source; therefore, we are willing to conclude that the sun, which is the main source of light to us inhabitants of the earth, is either an incandescent or phosphorescent body, a body in flames, or both at the same time. Of the latter supposition we shall speak before concluding.

The light which is produced from such a variety of sources, as from the fire-fly, the *ignis fatuus*, some species of fungi, the pyrosomæ, from burning phosphorus, oil, alcohol, ether, and all other carbonaceous materials; from iron, zinc, gold, calcium, and all other metals when rendered incandescent, either by heat, electricity, or compression, has characteristic peculiar to the source from which it is derived; and the time is fast approaching when we shall have gained a sufficient quantity of additional knowledge in the science of nature by which to designate the source of any given light from the peculiarities in the light itself.

The light from the stars owes its origin to incandescence *in* those stars, or at least such is our belief; for they resemble the sun in every particular experiment that can be made in reference to them, although the light which they emit is different from that of the sun. The special reasons that lead us to this belief we shall mention shortly.

On the contrary, the light which reaches the earth from the moon, the planets, and the comets, is in every respect analogous to that which causes our pictures to be visible in a looking-glass; it is a part or continuation of that light which proceeds from an incandescent source, and which can always be easily traced to that source. From this we learn the fact that some light reaches the organs of sensation direct from its source, that is, without any interposing obstacle, and that other light becomes visible to us not in a direct line, but after every variety of interruption of opposing obstacles, whilst the source from which it emanates may be either visible or invisible according to circumstances. The light from putrid fish, &c., from phosphorus when exposed to oxygen in the atmosphere, from meteors, the aurora borealis, an electrified surface, the fire-fly and glow-worm, as well as from the gelatinous living beings that communicate phosphorescence to the ocean, is in many instances certainly a species of slow combustion producing incandescence, and probably in all cases an example of some unknown analogous chemical combination. From our present knowledge of solar light and heat, it seems justifiable to make quite a distinction between the light of incandescence and that of phosphorescence; nevertheless, the two sorts of light, after all, may emanate from one and the same source.

Physicists may eventually be able to show that both light and heat may be bottled up, accumulated and preserved for future use by means analogous to those applied to electricity, or that light, heat, and electricity is one and the same thing. If this is possible—and it seems neither impossible nor improbable—we shall then have but little or no difficulty in accounting for phosphorescent and electrical light. At present, however, we are obliged to acknowledge our utter ignorance of the source of the latter sort of light at least.

We will now proceed to the discussion of the third question proposed:—

What are the properties of light?

These properties are numerous, and as interesting as they are numerous, because they refer in general to some application of light.

The properties alluded to may be classified as follows:

1. Progressive motion of light.
2. Reflection of light.
3. Refraction of light.
4. Double refraction of light.
5. Polarization of light.
6. Decomposition of light.
7. Interference of light.
8. Analysis of light and by means of light (Spectrum Analysis).

A FEW WORDS ON NEGATIVE BATHS.

BY S. R. DIVINE.*

It was but a few years ago that the majority of photographers knew nothing about restoring a worn-out bath to working order. The first symptoms of disease might be allayed by the addition of acid to the silver solution, but only to appear with renewed virulence after a short time. How many a disappointed photographer has pitched his silver solution out of the window when it refused to give the results he coveted, and resorted to his only alternative of making a new bath out of fresh silver! In those days nobody took any pains to save silvered paper or old solutions, and the amount of silver wasted was fearful to contemplate. After a time the hungry chemists conceived the idea of collecting the residues of the photographers' silver preparations, and extracting the precious metal therefrom, and a small proportion was thus saved and returned for use again.

But we are glad to notice that photographers are daily becoming more economical, and that a majority of them save their washings of prints, paper clippings, &c. When the bath becomes disordered, they do not throw it away or allow it to stand bottled up in some out of the way corner, not knowing what disposition to make of it, but they make it as good as new by a very simple process. And now we enter upon our subject.

A bath after a time exhibits signs of disorder, by the pictures becoming flat and misty. This is the case with either an ambrotype, or negative bath. A solution for negatives, however, may become unfit for use in a variety of ways, as for instance, by causing pinholes, streaks, and numerous other phenomena. Now for curing all these complaints in one operation, the following method is recommended: mix the bath with water (say an equal quantity) when it will become milky from precipitated iodide of silver. Filter the solution clear, and a portion of iodide of silver is removed. (A negative bath causes pinholes when it is saturated with iodide of silver, and becomes weakened by dipping plates—the iodide being precipitated and sticking to the plate like fine sand, and preventing the development. On washing the plate the sand-like particles are removed, and a transparent spot or hole is left). Next put the solution in an evaporating dish, and boil it to dryness. Dissolve the silver in water, and dilute till the hydrometer indicates a strength of fifty grains to the ounce. Add just sufficient acetic acid to obtain clear and vigorous pictures. The bath may attack the plates and dissolve out iodide of silver, leaving the film blue and thin, unless the plates are taken out just as soon as coated.

The glass must be scrupulously clean, or spots of rust or metallic iridescence will appear. The films may also have quite a strong tendency to peel when dry.

These observations are only applicable to the first plates that are dipped, and the operator must not be discouraged. The photographer who tries to make good negatives with a bath only large enough to immerse a 4-4 plate, will signally fail, or rather his bath will, after the first dozen plates, when his pictures will be uniformly bad.

It is true economy to keep a large bath, for it will not require doctoring so often, and the pictures will be a hundred-fold better. We were much pleased the other day on visiting a famous gallery in New York, to see two baths, each holding ten gallons of solution. The pictures from that establishment are all good.

* From the *American Journal of Photography.*

Proceedings of Societies.

The American Photographical Society.

The regular meeting of the society was held in the chapel of the University, on Monday evening, May 9th, Professor John W. Draper in the chair.

After some routine proceedings,

Professor Seely exhibited two prints, made from paper negatives, by the process which Mr. Newton had detailed to the society at its regular meeting in March last. Mr. Newton had, in the production of the negatives, used a plate-holder, in which the paper was curved during exposure, so as to form the arc of a circle of about two feet radius; the lens used was Harrison's eight-inch globe. Mr. Newton considered the delineation upon such a curved surface far superior to that on a flat surface.

The President laid before the society a copy of Dr. John Dean's work, "The Anatomy of the Medulla Oblongata," recently published by the Smithsonian Institute; accompanying the work were many very fine photographic and lithophotographic illustrations of the subjects treated of. Both the laborious production of Dr. Dean, and accompanying illustrations, were highly spoken of by several members.

Professor Seely exhibited several interesting photographs made in Hong Kong, China, and forwarded by Mr. Miller, of Vermont.

Mr. Rutherford inquired of Professor Seely for information upon the carbon processes, and his opinion of their success.

Professor Seely gave the general principles of the carbon processes, which, though somewhat numerous, are very similar. He did not think that they ever had, or would be likely to rival silver prints, either in fineness of detail, or general artistic effect. He thought that the public who purchase, would not sufficiently appreciate their good qualities to remunerate one for their production.

Mr. Rutherford inquired whether there had been any improvement by way of increased sensitiveness in the collodion process within the last five years.

Mr. Hull did not think that there had been any improvement yet made in that direction, or, at least, he had not been able to discover any in his own personal experience.

Professor Draper spoke of the illumination in photographic operating rooms; and the improvement in the construction of lenses with increased aperture, thus greatly shortening the time of exposure in the camera.

Mr. Rutherford said that he had not yet been able to secure photographic images of stars of the sixth magnitude, and he thought that unless some more sensitive process was discovered, astronomers would be disappointed in the assistance which they expected from photography. He gave some interesting details of experiments with light transmitted through a solution of sulphate of copper. He found that the light of an eleven-inch telescopic objective when transmitted through a stratum of such fluid, gave less distinct illumination than was obtained by the use of a four-inch objective, with the yellow, orange, red, and a part of the green ray, unobstructed as they were by the use of sulphate of copper solution.

Mr. Rutherford gave the results of experiments which he had made in the use of the spectroscope for correcting object glasses. He found that the greatest actinic force of well corrected object glasses was between the letters G and H of the spectrum. He also found the best photographic focus by either changing the relative positions of the flint and crown glass of a well corrected objective, or by applying other flint so as to shorten the focus of the combination about one-twentieth. He had so arranged the telescope, which he furnished to the Labrador Astronomical Expedition, and found the result quite satisfactory.

Professor Draper called the attention of the society to the fact of all collodions not working uniformly in the same focus. Iodine, bromine, and chlorine, each had a different focal action. This was very strongly marked in the daguerreotype process, with iodine and bromine; with the last the maximum intensity approaches much nearer the yellow lines of the spectrum.

Professor Seely called attention to an article by N. Cary Lea, in a recent number of *Silliman's Journal*, in which article Mr. Lea calls in question the theory of Davanne and Girard in regard to the fading of prints. He also described experiments which he had made for determining whether the deposit of silver upon a negative in developing the image was from the iodide or the nitrate of silver. He had substituted for the iodide of silver, the iodide of lead, but failed to get any satisfactory result.

Mr. Mason was of the opinion that the greatest proportion of the deposit came from the iodide, as might be illustrated by using in the developer iodized silver solution instead of plain nitrate in solution; the deposit from the former being much more rapid and yet apparently as fine as that obtained from the plain nitrate.

Professor Draper had thought the deposit came from the nitrate; but as old theories in chemistry were so rapidly being superseded by newly discovered principles, he might change his opinion upon the subject after further investigation.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 22nd June, 1864.

M. l'Abbe de la Borde has communicated the following to the French Photographic Society.

"The variety of designs presented by a kaleidoscope, when turned round, is familiarly known to every one, yet we are often surprised at the appearance of very curious and unexpected forms which we see disappear with regret.

"I have endeavoured to represent them by photography, and the means I employ are as follows:—I do not give them as excellent in every point, for I have only turned to account the objects I had at my disposal. I employed a quarter-plate camera with its lens. In the groove of the frame, a thick board was fixed with a hole in the middle, into which the kaleidoscope was introduced; the small aperture through which the images are viewed was in the interior of the camera, and the axis of the instrument placed exactly on the prolongation of the axis of the objective: this latter is inserted in the ring in the front of a camera of long focus, and fixed in that position. The whole is then placed on an inclined plane, so that the light from the sky illuminates directly the objects reflected in the mirrors of the kaleidoscope. Instead of turning the instrument to produce the different arrangements, it is easier to apply some plain glasses upon which fanciful objects have been previously fastened. The regular figures which result are depicted on the ground glass of the camera of long focus, and the images are focussed direct without being reflected: this portion is naturally more lighted than the others. It requires several minutes of exposure to obtain a picture on the collodioned plate. We cannot focus the portions of the image which are several times reflected, for they appear in the objective as if they came from greater distances, they lack distinctness, and they also exhibit the defect of planitude in the mirrors.

"Notwithstanding these imperfections, I believe I have attained the aim I proposed to myself, which is, to place before the eyes of those who are occupied with stained glass, paper hangings, and other kinds of ornamentation, very varied patterns which photography can supply by the hundred.

"I cannot pass over in silence another application of this instrument, although it is in some measure foreign to photography. On the surface of a disc of glass, I glue a host of flat objects, such as paper patterns, small leaves, mosses, lichens, &c., and place them as near as possible to the external end of the kaleidoscope; and, by a mechanism which it is unnecessary to describe, I make the disc turn slowly, and thus present them successively to the inclined mirrors; we then perceive a series of changing figures depicted upon the ground glass, among which we can select those best suited to be fixed by photography.

"In a room completely darkened, we can project the images upon a stretched canvas, which will admit of their being seen by many persons at the same time. We must then

bring the kaleidoscope nearer to the objective, in order to increase the dimensions and distance of the images, and illuminate the disc by a strong light; in a word, it is a magic lantern in which we replace the painted slides by a kaleidoscope. If, instead of objects glued upon the glass, we apply various tints mingled, and thrown haphazard upon the surface of the disc, the figures receive the colours, and in their unexpected evolutions are very pleasing to the sight."

The *Moniteur de la Photographie*, has published an article on "Enlarging," by M. Crespen, of Nismes, extracted from a work now in press, which, it is expected, will excite much interest. He says, "When this discovery (of enlarging) was made, the photographic world wished to adopt it, and share in its results. But the processes were difficult and the results defective; it was necessary to simplify the method that was so full of promise.

"Dr. Sabatier's process, adopted by some operators, gave very fair results, but not sufficiently delicate, and success was often uncertain. I applied myself to the task, and, after several trials, arrived at satisfactory results.

"It is quite certain that to succeed in causing any process to become generally adopted, its chief element must be simplicity, and so clear, that it may be understood by every one, and give complete success. The following is the process of this sort of operation:—

Ether	120	parts
Alcohol	100	„
Cotton	3	„
Chloride of cadmium	2	„
Tincture of iodine	2	„

Spread this collodion on the glass plate, sensitize in the negative bath, and pour upon the unwashed film the following solution:—

Gelatine	10	parts
Honey	5	„
Water	300	„

and then allow the plate to dry.

"We thus obtain as complete a transparent positive as possible, which permits of a very beautiful negative.

"Have a negative made in the conditions necessary for enlarging, complete in all its details, but thin.

"The collodion negative already mentioned is excellent for this purpose, provided it be strengthened with pyrogallic acid. Varnish with the above honey mixture.

"Put the negative in a printing frame with the plate prepared with chloride of silver. Expose it until the projecting edge has acquired a brown tint. Return to the operating room; the proof will be found visible; wash it in four or five waters, and immerse it in the gold toning salt for four or five minutes. Wash it again, and immerse it in hyposulphite of soda. This proof will be of remarkable beauty, and will give in the solar camera, in a few seconds, a negative surpassing in excellence everything hitherto obtained in sharpness and detail, whatever may be the dimensions chosen. In one or two seconds the printing will be done. The picture is developed like ordinary negatives.

"The extension of the collodion upon the plate, however, large it may be, presents no difficulty. I operate upon plates 16×20 and 20×28 inches without impediment. By this means we may succeed in obtaining positives upon salted or albumenized paper altogether irreproachable and free from the necessity of being retouched. A system of amplified reproduction, promulgated lately, is that in which the enlarging lens being placed in a telescopic tube directly opposite the sun, produces an image in chloride of silver in the space of thirty minutes. But this method, although good, cannot be employed in southern latitudes without exposing the apparatus to taking fire; as to the method I propose, its manipulation is easy, certain, and superior to any that has hitherto been described. Whatever the intensity of the negatives, we can still operate. This is a very great advantage, as many persons who have already sat for their portraits can have them enlarged without requiring to sit again."

The Imperial Court at Bordeaux, confirming a judgment of the Tribunal of Commerce, of that city, denies a general artistic character to photography, admitting it only in exceptional cases. The terms of the decision are curious, and deserve to be widely known among photographers. It appears that Combes and Mosquet formed a partnership for carrying on a photographic business, in September, 1833. "This company," says the Court, "must be characterized exclusively according to its object, and the nature of the operations to which it was devoted; and that in such case, it does not belong to the contracting parties to deny the character of these operations which are peculiar to them; and, therefore, it is unimportant to examine what each of the partners has thought, or wished to do, with respect to the civil or commercial qualifications of the company. Seeing that the essential principle which serves as the basis of the art of photography has now become public property, and is worked as a manufacture, that if genius alone had made this excellent discovery, its applications, in the circle of processes now known, used, and practised by every one, no longer require the same effort, and cannot, as a general rule, be considered as productions of genius and intellect. That, doubtless, it is possible to recognize exceptionally this quality in some photographic productions, the original of which has been skilfully composed, arranged, or presented to the luminous rays, so as to derive from the latter an action with extraordinary effects, and profoundly impressed with the personal talent of him by whom they were obtained; but it must be otherwise when we proceed to characterize the profession of photographer, according to the whole of the products created by the art in the normal and usual conditions of its practice. In fact, if in the latter case the taste, more or less developed, of the operator may still, as in many useful arts, give some superiority to his works: this taste, nevertheless, takes, in the production of photographic works, only an insignificant part in transforming into a production of genius or intellect, the result of physical combinations and chemical manipulations, regulated upon the principles of a science become common. Seeing that the art of the photographer is at first centered upon the production of negatives, which are nothing else than manufacturing instruments intended for the manifold reproduction of pictures invariably the same afterwards, by a reproduction made in a second series of processes, the working of which requires nothing but practice. That these various creations present some analogies one with modelling, another with printing, and not necessarily reflecting the personal originality of its author, guarding the impress of his peculiar feeling to see, comprehend, and translate nature, and make it thus virtually assimilate with a production of the fine arts. That, on the contrary, by the very nature of the means employed, they acquire a manufacturing character, which is also confirmed by the accessory usages of the profession, such as the public and permanent exposure and sale of frames, negatives for printing, &c. That the photographic art, although deriving its origin from one of the most marvellous conceptions of the human mind, is in ordinary practice the source of an industry, consisting essentially of buying, working, and reselling the merchandise upon which it operates. It being recognized that this working does not constitute a production of the mind, or of genius; it matters little in what the value acquired by the industrial transformation exceeds that of the raw material, the purchase and sale of the latter does not thereby lose the character of a commercial transaction which the law has given to it. The company formed by Combes and Mosquet is therefore a commercial company."

I do not think that more was ever claimed for photography, than that the producer of a negative possessing artistic qualities should be entitled to rank as an artist. The objections given above would deny the rank of artist to the engraver.

CARBON PROCESSES.

SIR,—Having read the reports appearing in the PHOTOGRAPHIC NEWS, and *Notes*, respecting the various processes in carbon printing, I feel constrained to lay before your readers the especial claims of the patent process secured by Mr. John Pouncy, of Dorchester. I have visited that gentleman's studio and minutely watched the process, together with its unparalleled results; and I am fully prepared to assert that there is no process in existence that can in any way equal it. Mr. Swan's process, or so-called process, is only a modification of what Mr. Pouncy abandoned two years since (specimens of which I have seen), and which was based upon the original principle, by which it is known Mr. Pouncy produced the first carbon prints; the whole process of which has been so thoroughly explored by him that he has left it only to adopt another process far superior. In my opinion, photographers have nothing to hope for in such methods as those adopted by Mr. Swan and others of his class. It is quite possible that Mr. Swan should produce some very good pictures, but they are few and far between: the labour, together with the uncertainty of the process, is so great, that it cannot be depended upon. This fact can be abundantly proved by the number of operators who have failed in their attempts by such process; not so, by Mr. Pouncy's patent process. I can obtain from him sensitive paper, that will keep any length of time, from which I can produce negatives, positives, transparencies, transfers to china, which will stand fire, transfers to stone or metal, and can print therefrom superior to anything yet produced of that kind from stone, containing all the detail and middle tints that the original negative can give. Here, sir, we have a complete system of photography, from beginning to end; and which I believe meets all the requirements of the art; and further, is in the future destined to meet the vast requirements of our popular works, with first-class illustrations. You stated a few weeks since, that the commission now sitting in France experienced great difficulty in awarding the prizes, from the fact of the sameness of the various carbon processes, but which cannot be applied to Mr. Pouncy's present process; it being entirely different from every other I have yet seen or heard of. To my mind, the simplicity of this process is so great, that it cannot fail to be appreciated when known, and when more widely known, will be more full appreciated.

I think it is absurd for any photographic society to be influenced, and led away by the constant elopements made from the old process of carbon printing, the nature of which they know so well; and leave in contempt the more simple, perfect, and consistent process of Mr. Pouncy.—Sir, I am yours, &c., WM. TUBB.

Grove Street, Southampton.

[Our correspondent writes in a very positive manner on a subject with which he seems very imperfectly acquainted. Mr. Swan's process *is*, as it professes to be, a modification, and a very clever one, of Poitevin's process, of which also Mr. Pouncy's former process was a modification. We have little in photography, at the present time, but modifications of old discoveries. Mr. Pouncy's last process is a very clever modification of the earliest perfected photographic process, that of M. Nicephore Niepce. The processes of Mr. Pouncy and of Mr. Swan have each their respective advantages. Mr. Pouncy's is more simple and easy in manipulation, but the exposure is eight or ten times greater than in Mr. Swan's; and whilst we have seen some of Mr. Pouncy's that have very much merit, they have not had, as, indeed, the very nature of the materials rendered impossible, the same delicacy and beauty as Mr. Swan's. We have no wish whatever to place the two processes or their results in antagonism, but when our correspondent institutes the comparison apparently in ignorance of part of the subject, we are bound to state our conviction based upon familiarity both with the practice and the results of both. We have rendered Mr. Pouncy's prints full justice: his process is ingenious, and its results good; we look with interest for its further developments, and are glad to hear at any time of its progress. We have not, however, yet seen from any process an image produced from stone, with all the gradation which a negative from nature can give, nor indeed anything like it. A statement of this kind should be accompanied by proof.—ED.]

MANIPULATION.

SIR,—I scarcely know what excuse to offer for attempting to write on the above subject, excepting that I think sufficient attention is not given to it by some operators, and that in giving my own opinion, formed by experience, I might induce young beginners of the art, and amateurs to turn their attention to that which is the foundation of good and successful photography, viz., skilful manipulation, instead of searching after fresh processes, secret formulæ, &c.

When we view the cartes of Mr. Jabez Hughes, or Mr. T. R. Williams, and others celebrated for such work, or the stereographs of Wilson, or England, it is not simply the excellence of the lenses used, or the artistic arrangement of light and accessories that we admire, but it is for their extreme delicacy and cleanliness, their brilliancy, their roundness, and evenness withal. And what has been the grand secret of producing such pictures? Not chance; oh, no, I do not believe in chance for photography, excepting in catching a charming expression now and then. Not only the lenses which were used, or the light in which they were taken, nothing but the *skilful manipulation* of the above photographers.

Again, we hear of short exposures in portraiture, with the use of formic acid, by M. Claudet; success with lime toning, by Mr. Jabez Hughes; chloride of copper in the toning bath, by Mr. Mayall; combination printing, by Mr. H. P. Robinson, *and all with success;* then, why cannot every photographer do the same? The above gentlemen do not keep their formulas and mode of working a secret; what is the difference? I believe it is chiefly because they are not so *skilful in their manipulation.*

For example, we will look at the production of a negative. To begin with, perfect *cleanliness* is imperative in coating the plate. If the coating is not done with dexterity, what is the consequence? Unevenness of the film, crapiness, a species of reticulation, &c., producing "mottled backgrounds," "comets," &c. Then, in sensitizing it, how carefully must the plate be inserted in the bath, moved up and down, and taken out, or what is the result? All the ills which plates are heir to follow; streaks, marks, stains, &c. Again, in developing the latent images, with what tact and dexterity must we flow the developing solution to ensure a clean picture; even vigour and brilliancy in a negative, depend much on *mode of flowing* the *developer over the plate;* this is a point of the greatest consequence too often overlooked. I will not attempt to say why or wherefore, but simply direct the reader's attention to the article on "Developers and Intensifiers," by Mr. G. Wharton Simpson, in the PHOTOGRAPHIC NEWS, February 19th, 1864.

Leaving the negative, how careful must we be in sensitizing the paper, printing, washing, toning, and fixing the print, to obtain brilliant results.

Inasmuch as skilful manipulation is of the first importance to the engraver, the sculptor, the mechanic, &c., so it is to the photographer. He requires to do everything with ease and dexterity, not too hasty, nor too slow, and have for his watchword, *Cleanliness;* then success is certain. I would say to every beginner of the art, do not believe in such a thing as secret formulas, select a good mode of working, and to that firmly and steadily adhere.

I respectfully apologize to the learned readers of the NEWS for dwelling on points with which many of them are familiar. In conclusion, pardon me; I have been attempting to write for others. DAVID DUNCAN.

Brighton.

Photographic Notes and Queries.

Retouched Pictures in the Exhibition.

Sir,—I notice in your critique on the photographs in the Exhibiton of the Photographic Socity, which appeared in the News for the 3rd of June, you mention in terms of the most unqualified praise, as by far the best exhibited, the portraits of Mr. T. R. Williams. Fully concurring in your opinion as to the beauty of the *pictures*, I wish to ask you if they deserve all your praise as *photographs*. If it be true, as was very generally whispered amongst visitors attending the private view, that these portraits owe much of their beauty to a method of very skilful retouching, or rather working upon by an artist. It is asserted, that the beautiful modelling and fleshy texture of which you speak so highly, are due to the skilful artist rather than the photographer, and that the use of wax, or encaustic paste, conceals all traces of colour, and even permits the picture to be sponged without detecting the presence of the neutral tint employed. If this be true, sir, it is interesting to photographers to know that these exceptioually fine results, are uot due to photography, and also to know to what extent retouching can bo applied without being detected.—Yours very truly,

Argus.

[We heard the silly whisper to which you refer, but did not believe that it would be seriously believed by any intelligent photographer. That it is not true, you might easily have satisfied yourself by looking at the back of the frames, where duplicate copies of each print are pasted, aud may be examined without difficulty. We also have examiued other uutouched duplicates of these prints, and have no hesitation whatever iu stating our conviction, uot one of them has received a touch of the pencil. How any one could be so foolish as to faucy that such effect could be obtained by retouching, we cannot conceivo. Encaustic pasto is very useful in giving uniformity of surface after retouching, but would not remove the inevitable trace of stippling and hatchiug.—Ed.]

Pinholes, Glue, &c.

Sir,—In last week's Photographic News, you give a valuablo and iuteresting article on that frequent source of annoyanco to the photographer, *pinholes*, and if the meaus you point out is a remedy, you will have couferred a great boon on the profession, but I wish to direct your attcution to your Year Book, 1864, by which you must havo contributed to much of that trouble, if the advice there given has been followed; at p. 30, you give *three grains* of KI to the ounce of nitrate of silver solution, which, I apprehend, is more than could bo dissolved in it; in fact, I made a bath a few days ago, and put *one* grain KI to each ounce, and then found a quantity remaining on the tiltering paper, showing that it was too much; Mawson, in the formula accompanying his collodion, gives half a grain to fifteen ounces; which is right?

2. At p. 32 of the Year-Book, au American remedy is given, KC_2N. Now, is not the *rationale* of that remedy the effect of the cyanide precipitating the excess of the iodide, on the same principle that it acts on the iodide iu clearing the developed negative? Now, I am loth to intrude my opinions to practical men, as my practice only dates from August last, but having read much, aud weighed such information well, I submit to your greater experience, and shall be happy if I can direct attention to a corrective for such a vexatious trouble, and as you are on the subject, leave it to you to use it as you will.

3. Again, with regard to the composition of the gelatine in Mr. Swan's carbon process, I dissolved some gelatine as directed, but not being able to get the pigment from Newmau's yet awhile, I put it away in a stoppered bottle; it forced the stopper out, and has uudergone all the changes described, forcing itself out and become full of vesicles. Now, whatever may be the chemical changes involved, is not the diluted gelatine subject to the same laws as gilder's size, which is made of parchmeut cuttiugs, only that the latter is made of the strength required for use, and the gelatine is dried like glue, but when diluted becomes then as size, which is always a source of trouble to the workman to keep long in hot weather, goes into holes, and turns into an useless liquid having no adhesive qualities; nor do I, speaking practically, know of any remedy that will then fit it for good work; it must be made *fresh and fresh*, which I expect must be the case with the golatiue. I have, I am afraid, trespassed too much on your time, so conclude—Yours very obediently,

J. S. W

P. S.—At the close of last year, I referred to you respecting the nitrate of soda, when you said I must have used carbonate of soda, I found that the nitrate I had was the commercial article, and that on getting *pure* nitrate of soda *it did not* remove the albumen.

[The principle hitherto recognized in preparing a new nitrato bath has been to *saturate* it with iodido of silver. Whatever amount of iodide of potassium were added, a very small amount of the iodide of silver formed would be taken up; the rest, if in excess, being filtered out. From Dr. Vogel's experiments, this plan of securing perfect saturation appears unwise. The proportion to which you refer, as given in our Year-Book, is the result of a clerical error: it should have been 3 grains to a pint of solution. The error was corrected at the time, but passed in some copies. 2. If cyanide of potassium were added to water, holding iodide of silver in suspension, it would, as you imagine, dissolve it as it does the iodide in the collodion film; but on being added to the silver bath, another action takes place, called double decomposition, and cyanide of silver and uitrate of potash are formed: the latter being soluble, remains in solution; the former being insoluble, falls as a precipitate. 3. Size and glue are the same material, and will doubtless in similar conditions obey the same laws.—Ed.]

Talk in the Studio.

Permanganate of Potash as a Test for Hypo.—Our correspondent "N" is unwilling to pursue a controversy beyond the point at which it ceases to be useful. He mentions, however, that the solution he used was that sold as Condy's Fluid, containing two grains of the salt to an ounce of water. He expresses a convictiou that those interested in the matter will fiud that hypo does exercise a peculiar effect on the solution differing from that of organic matter simply: but that careful observation will be necessary, as some other substances have a somewhat similar effect on the permanganate.

Exchange Club.—Miss Oughterson desires to exchange either mounted or unmounted stereos as members may desire. It is of course understood, we apprehend, that members will readily accommodate themselves to each other's wishes in this respect, the statement in the list published merely indicating the style preferred.

Dish for Exciting Paper.—The Rev. J. H. Johnson sends the following communication to the Photographic Journal, in reference to a suggestion which appears in our last Year-Book:—"In the Year-Book of Photography (1864) there is a paper by Mr. Blanchard upon photographic printing, in which he gives a method of constructing a cheap dish for sensitizing paper. I need not quote this gentleman's words at length; it will be sufficient to state, as briefly as possible, what the plan is. Four pieces of dry and well-seasoned board, of the requisite thickness and length, are provided. In each of these plough-grooves are cut the whole length of one side, sufficiently wide to take a piece of plate glass; this being inserted and the sides screwed together, the dish is finished, except that the wood must be well covered with shellac varnish. Five years ago I made a dish in the way described. I used no putty, as Mr. B. recommends, in the grooves, but varnish only. The wood was walnut. I was much pleased with the article, not only because it had a perfectly flat bottom, and thus secured an even action upon the surface of the paper, but because the cost was very trifling. I soon found, however, that I could not return the nitrate of silver to its bottle, even when I used a funnel, without considerable waste. This discovery greatly altered my opiuion as to the real value and economy of the contrivance, and the result was the banishment of the dish to the society of other useless apparatus, where it remained until the commencement of the present year. On again taking up my dish, I thought it would be possible to make some kind of spout through which to run off the fluid. This idea I did not carry out, for I saw several difficulties in the way, which I thought I could not surmount. I then got a bottle with a good lip, and cut off the neck, which was easily done with a hot iron, and after making a hole at one corner, as close to the glass as possible, I cemented the bottle-neck into it with lac. Nothing now remained to

complete the work but to grind in a stopper. This I did; and now my wooden box, with a glass bottom, answers every purpose as well as the most expensive dish; indeed, I use one made in the same way for toning."

THE EMPEROR AND ENGLISH LENSES.—Perfidious Albion is invading France. We understand that Mr. Squire has recently completed an order from the Emperor—we were not aware till now that he was a photographer—of one of his new rapid lenses mounted in silver, engraved with the imperial arms, with a silver-bound camera to match, comprising all modern improvements.

ANOTHER MODIFICATION OF THE CARBON PROCESS.—In another column will be found a communication from Mr. Cooper, in which he describes a very important modification of the carbon process, by Mr. C. K. Wild. We have seen the earliest prints produced by this process, which are full of promise, and, indeed, have no faults but those due to the first steps in an untried method of manipulation. The colour and half-tone were both satisfactory; the exposure they had received was from three to five minutes, in diffused light. We have also seen Mr. Cooper's specimens, by Mr. Swan's process, mounted on albumenized paper according to the suggestion of Mr. Henderson, made in our pages some weeks ago. The result was perfect, and described by Mr. Cooper as exceedingly simple.

To Correspondents.

IGNORAMUS.—Add to each ounce of your iodizing solution six grains of iodide of cadmium, and two grains of bromide of cadmium; then iodize your collodion a few weeks before you require to use it. It is probable that the addition of a grain or two more of pyroxyline to each ounce of your collodion would be an improvement.

A YOUNG HAND.—The mode of proceeding in dissolving gelatine is as follows:—Break up the gelatine into small pieces and add the prescribed proportion of water to it, cold. In the course of a few hours all the water will be absorbed by the gelatine, which will be a swollen gelatinous mass. It is now to be dissolved by the aid of heat; place the vessel in hot water, which will shortly reduce the gelatinous mass to a fluid consistency. As a general rule, the quantity of water given by Mr. Swan, four ounces for one of gelatine, will be found the best; but with particular samples modification must be made, some will require a little larger proportion of water, and some a little less. 2. The gelatine is to be poured on to the glass plate, and its spreading assisted with a glass rod or camel-hair pencil, as it will not flow like collodion.

S. C. A.—The triple is better for architecture and copying than the single lens, and as good for landscapes. 2. No; we have not seen it happen. 3. The first you mention will best suit your purpose.

J. C. S.—Various formulæ are used by different photographers for solar camera development printing. The best toned results we have seen are by Mr. Sydney Smyth. He uses:—

Bromide of potassium	7½ grains
Chloride of ammonium	4½ „
Gelatine	3 „
Water	1 ounce.

The paper is immersed and dried, and then excited in a 50-grain silver bath, with a little acetic acid. The silver solution is applied with a Buckle's brush, or a piece of Canton flannel. Development is effected with a saturated solution of gallic acid. You will find fuller particulars in our YEAR-BOOK.

M. A. O.—We judged, of course, from the examples sent.

F. D. C.—There is very little loss of sensitiveness induced by nitric acid in the bath, when a freely bromized collodion is used.

E. C.—There is no method of testing albumenized paper except trying it, which, at present, we have not time for. We see no reason to doubt that the paper would produce a good print; so far as a cursory examination of it goes, there does not appear any fault. The first time we are printing, we will try it, and let you know the result.

JOHN ALEXANDER.—We have not tried the preservative described by Mr. Blanchard, but have heard some good accounts of it from those who have. 2. We cannot state whether a different quality of honey will answer as well. 3. Mr. Blanchard has failed with some samples of glycerine; Price's only has succeeded. 4. A negative bath in which all nitric acid has been neutralized by carbonate of soda, and then, after sunning and filtering, been treated with acetic acid, would answer the purpose. 5. The expedient of roasting iodide of mercury negatives, to restore softness, is not always absolutely a certain cure. 6. Isinglass will doubtless answer in Mr. Swan's process, but the proportions will probably require modification.

PARVUS.—A patch of imperfect development occurring where the iron solution first comes into contact with the film, is only to be effectually cured by more skilful manipulation, so as to cover the plate with a gentle sweep of the solution, rather than a stream falling on one spot. Some conditions of bath collodion and developer are more conducive to this defect than others. If the bath is getting weak, and only forms the iodide of silver on the surface, instead of right through the film; if the developer be old; or if the collodion be horny, there is a greater tendency than under other circumstances; but skilful manipulation is the best cure.

CECIL.—It is a very familiar defect of some samples of simply iodized collodion, especially where a potassium iodizer has been used. The addition of from half a grain to a grain of bromide of ammonium to the ounce, or mixing in equal parts with a good bromo-iodized collodion, will, probably, remove the defect entirely. 2. It is scarcely probable that you will make a good job of relacquering your brass-work, unless you are a little familiar with such work. Lacquer is composed of shellac dissolved in methylated spirits, with dragon's blood, &c., added, to obtain the desired colour. It is probable that the careful use of spirits of wine will clean the dirty spots to which you refer. 3. It not unfrequently happens that when a collodion has become old and decomposed, the film is soluble in strong alcohol, and hence the effect of the varnish; but a benzole varnish will not dissolve it. If you wish to use a spirit varnish, first apply a coating of dilute albumen. This will prevent the solution taking place.

H. O. NEILL.—Newman, of Soho Square, manufactures a preparation for the purpose. A dilute solution of gum tragacanth will also serve.

W. S. A.—We should prefer No. 2, as unquestionably the best maker.

S. J. X.—Drain a plate as thoroughly as you can before placing it in the camera; it is a good plan to place a piece of blotting paper in the slide still to catch the drainings; but, of course, never let the plate get surface dry, or at all approaching that state. 2. If you send us a print from a negative with the lines in question, we can judge better. 3. Round opaque spots may occur from a variety of causes; very often from an imperfectly cleaned plate; sometimes from splashing the nitrate by putting down the shutter of the slide with a jerk. We can better state the cause of defects by seeing them than by a short description from a young hand.

CALCIUM.—For instantaneous stereographs the No. 1 of No. 2 will, probably, answer your purpose best, and will give very good results. 2. An instantaneous shutter is not absolutely necessary, but is desirable and convenient. 2. Where the film has a great tendency to repel the bath, the addition of a drop or two of distilled water to each ounce of collodion will often make it more permeable, and remove the difficulty. 3. It is probable that the tannin and malt will suit you best. Take care to wash very thoroughly before applying the preservative. Some samples of collodion will adhere without a preliminary coating, but if you find a tendency in the film to leave the plate, by all means try preparing the plate. India-rubber in benzole will, probably, answer your purpose best, and gives the least trouble. 4. The brown stain arises from the tannin solution coming into contact with some free nitrate still left in the film. 5. Use for dry plates a nitrate bath containing more acid, acetic acid is safest in this case, than for wet plates. Take courage, and be patient. Patience and deliberation are necessary to success, and these, with perseverance and care, must ensure success. Your pictures are not so imperfect as you think. The equestrian portrait is very good. The landscape would have been better for a second or two more exposure, but is not bad. Card No. 1 is a little under-exposed, and not quite sharp; No. 2 is better as regards exposure, but not quite sharp; No. 3 is best. Do not be afraid of giving sufficient exposure; this is a material point in getting delicacy. Short exposure and forced development often cause coarseness, &c. Let us hear from you again.

C. SOUTAR.—M. Daguerre died on the 12th of July, 1851, and was buried at Petit-Brie-sur-Marne, where a monument to him has been raised.

AN ANXIOUS NOVICE.—Leave a coated plate in your bath for a few hours. Use the collodion which gives you best results. You do not state whether you are working for positives or negatives, but it is probable that your bath will be better for a little more acid. Mr. Barrett's manipulating camera is described on pp. 79 and 90 of our first volume.

PETER GAIFFITHS.—The mode of preparing the fixing bath is just to weigh the hypo and measure the water. We use four ounces in a pint of water. It may be used stronger without disadvantage, the only effect of a very strong solution being a little more reduction of the print in depth and colour. It is scarcely worth while to bother yourself about the specific gravity of the solution. The instructions and formulæ you have given your son are quite right, and if carefully followed, you will not be likely to have troubles in that direction.

"THE PHILADELPHIA PHOTOGRAPHER."—We have forwarded the PHOTOGRAPHIC NEWS to you for months past, regularly, with an accidental interregnum once of a few weeks, and when this was discovered, the omitted numbers were sent at once. If you do not receive the NEWS regularly, there is some miscarriage. Enquire at your end, and let us know what numbers you require, and also if it still fail to arrive.

Several Correspondents in our next.

Photographs Registered During the Past Week.

MR. F. W. EVANS, 240, Old Kent Road, S.E.
- Photograph of F. Hodges, Esq., and his Steam Fire Engine "Torrent."

MR. JOHN STUART, 120, Buchanan Street, Glasgow.
- Two Photographs of Rev. John Thomson.
- One Photograph of Rev. William Clark.

MESSRS M. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne.
- Two Photographs of the High Level Bridge.
- Photograph of the Stephenson Monument, Newcastle-on-Tyne.

MR. A. S. WATSON, 2, Regent Road, Great Yarmouth,
- Photograph of Edward Sewell, Esq.
- Photograph of Rev. Mr. Simpson, Wesleyan Minister.
- Photograph of Rev. Mr. Cobbold.
- Photograph of Bilney Rectory, Norfolk, the seat of Rev. Mr. Collison.

MR. GEORGE ROBERT FITT, 100, Regent Street, W.
- Photograph of F. C. Skey, Esq., F.R.S., President of Royal College of Surgeons, England.
- Photograph of James Moncrieff Arnot, Esq., F.R.S., Member of General Medical Council.
- Photographic Group—Major-General Sabine, R.A., President Royal Society.
- Photograph of Dr. W. A. Miller, Treasurer and Vice-President Royal Society.
- Photograph of Dr. William Sharpey, Secretary Royal Society.
- Photograph of Professor G. G. Stokes Secretary Royal Society.
- Photograph of W. H. Miller, Foreign Secretary Royal Society.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 304.—*July* 1, 1864.

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HINTS ON THE USE OF STOPS.

A PERFECT knowledge of the operation of stops or diaphragms in photographic lenses, and an apt judgment in putting that knowledge into use, constitute one of the most important qualifications of a successful photographer: the subject is, nevertheless, one upon which the most limited, if not also the most erroneous, ideas prevail amongst a very large number of photographers. We propose here to state a few facts, and offer a few practical hints on the subject, without entering into the optical considerations upon which it is based—questions which, if entered into fully without a certain acquaintance with optical matters on the part of the reader, might tend to confuse, rather than enlighten the unscientific student.

Stops are always used as corrective of some defect or short-coming*; and it may be stated broadly, that they perform two distinct functions. By their position they affect the incidence of the pencils of light upon the lens, and thus modify the shape or character of the image, as regards distortion; and by the diameter of their aperture they regulate the size of the pencils of light, and thus modify the character of the definition.

THE SINGLE-VIEW LENS.—Let us consider first the *position of the stop.*

In the ordinary single-view lens, which is either of plano-convex or slightly meniscus form, its plane or concave surface placed frontwise, the stop is, of course, always placed in front of the lens, and the character of the image is materially modified by the distance at which the stop is placed from the anterior surface. A somewhat unsatisfactory rule has at times been stated as an approximate guide in placing the stop, to the effect that it should occupy a position in front equal to the diameter of the lens; but as lenses of the same focus vary considerably in diameter, a more satisfactory rule is based rather on the focus of the lens than its diameter, and it may be stated generally that the balance of advantages in regard to the view lens, as commonly made, is found in placing the stop at a distance in front of about one-fifth of the focus of the lens: thus, in a stereo lens of five inches focus the position of the stop would be one inch from the interior surface of the lens.

The approach of the stop nearer to the lens increases the area of illumination, it decreases the barrel-shaped distortion, increases the curvature of field, and renders the marginal definition less perfect, the last defect being a natural result of the preceding one. By increasing the circle of illumination, it will be seen that it permits a larger angle of subject to be included in the picture, provided the scene is one in which the defects involved are unimportant. In interiors, for instance, the subjects are generally such as are improved, rather than injured, by the curved field, and the upright lines being rendered straighter, a balance of advantages is gained by the stop being placed a little nearer to the lens. Sometimes also in street-scenes, lane-scenes, and some landscapes, especially where the subject will admit of vignetting, so as to gain the effect of wide angle and conceal imperfect marginal definition by the gradation of tint in the edges. On the other hand, where a moderately flat field is important, and where it is important to secure good definition throughout, a loss, rather than a gain, results from removing the stop nearer to the lens.

Removing the stop further from the lens, decreases the field of illumination, flattens the field, improves the marginal definition, tends to equalize the illumination all over the field, but slightly increases the distortion or curvature of lines. Where uniform and good definition is more important than a wide angle, and where a flat field is imperative, as in copying, the removal of the stop to a due distance from the lens will give the best result. Probably, as a general rule, it will be found that the stop should never approach nearer to the lens, as usually made, than one-sixth of the focal length, or be removed further from it than one-fourth.

The Size of the Aperture chiefly affects the character of the definition. The full aperture of a view lens cannot be used in producing a photograph. From the imperfect correction due to the necessary form and position of the lens, the definition of the image and curvature of the field would be intolerable. In proportion as the marginal rays are cut off, and the pencil of light attenuated by the reduction of the aperture, the definition is improved, both in quality and depth. A very little reflection, even by the unscientific reader, will render this apparent. The more acute the angle formed by the cone of rays passing through the lens, the more attenuated and prolonged its point will be, and the more delicate the definition, not merely on one plane, but through several planes, and thus *depth of focus*, as well as crisp definition, are secured. To use a physical illustration, the large aperture gives a result like a lead pencil with a blunt broad point, with which it is impossible to produce a fine line, whilst the small stop brings the pencil to a fine point, and permits of the finest and most delicate delineation.

But there are limits to the advantage gained by reducing the size of the stop. In the first place the loss of light and consequent prolongation of exposure are in the direct ratio of the reduction of the aperture. The rapidity of a lens depends mainly upon its angular aperture, or the relation of the aperture to the focus. The larger the aperture and the shorter the focus, other things being equal, the more rapid will be the action; and the smaller the aperture the longer will be the exposure. An aperture or stop of half an inch diameter admits only one-fourth the amount of light admitted by a stop of one inch diameter, and will require an exposure of four times as long. A stop of a quarter of an

* This short-coming may not be a defect *per se*, but an incapacity to fulfil all the requirements of pictorial art in photography.

nch diameter only admits one-sixteenth of the light which a stop of one inch admits, and will require sixteen times as long exposure as the one-inch stop; one-eighth of an inch sixty-four times longer, and so on, the increase of the exposure being in direct ratio to decrease of the aperture. In practice there are at times circumstances of photogenic action which very slightly modify these relations of time to aperture, but not sufficiently to affect the general question. Reduction in the amount of light, moreover, not only prolongs the time of exposure, but frequently renders it difficult to obtain sufficient intensity of the image.

Besides, the loss of light consequent upon using a very small stop, there is another evil which is too frequently lost sight of. When the aperture is reduced to a minimum, there is a considerable loss of relief in the image. If the aperture of a microscope objective be reduced too much, there is a loss of separation, as it is termed. With the photographic lens stopped down unduly, there is a loss of vigour, relief, separation of parts, and effect of distance. The picture is distinguished by what an artist would term *adhesiveness*: everything is compressed together and dwindled, and a general map-like effect is produced, instead of a picture having relief and distance. Thus, whilst the stop is valuable in improving definition as definition, it is destructive of artistic qualities, if reduced beyond what is absolutely necessary in securing a certain amount of sharpness. The small stop improves definition; the large stop gives relief, and the happy medium must be attained by preserving a due relation between the size of the stop, the focus of the lens, and the character of the subject. For a reproduction or flat surface, where no relief exists in the subject, and fine definition is required, there need be no limits to the size of the stop, except those imposed by loss of light and the danger of aberration from diffraction; but for objects in relief, judgment must be used to secure a balance of advantages.

Stating the question generally, the largest stop which should be used with view lenses of short focus, say of from four inches focus to ten inches focus, should not exceed from one-tenth to one-fifteenth of their focal length; whilst, for the larger single lenses, which are generally less perfectly corrected than smaller ones, the aperture should not exceed one-twentieth of their focal length. The aperture should be reduced beyond this in many cases, and to such degree as circumstances will permit, taking care not to reduce it so much as to render the view flat, adhesive, and insignificant.

Depth of Focus, or the sufficient definition of objects on several planes of distances, is only secured by the use of small stops. But it should be remembered that all objects, beyond a certain plane and thence to infinity, are sufficiently defined. It is only the different planes near to the lens which are palpably out of focus at any time. It has been calculated that with an aperture of one-fortieth of the focal length, all objects beyond four feet from the lens would be in focus, with a lens of one inch focus; and so on, reckoning four feet for every inch of focus. Thus, with a lens of five inches focus, and one-eighth stop, all objects beyond twenty feet and thence to infinity, would be in sufficient focus. With a larger aperture, the distance beyond which everything would be in focus would be a little greater. But it will be seen that where rapid or instantaneous exposures are required, sufficient depth of focus can be secured by using care not to include very near foreground objects, but to focus for an object at a distance of something more than four times the number of feet, which the focus of the lens is in inches.

In focussing, the use of a very small stop sometimes dimininishes the amount of illumination so seriously, that it is difficult to see whether the utmost possible sharpness has been obtained. On the other hand, if the image be focussed with a large aperture, and a smaller stop then substituted for the large one, another risk is incurred. At first sight, it might be argued, that as the use of a smaller stop always improves definition, it would be quite safe to get the image as sharp as possible with a large stop, and then reduce the aperture still more. This is true to a certain extent; but it also happens that the use of a smaller stop has the effect of lengthening the focus a little, and thus throwing the image a little further from the lens, so that if the focus were taken with full aperture and a very small stop then introduced, much of the advantage of improved definition would be rendered nugatory. Perhaps the best plan is to focus with the smallest aperture which admits sufficient light to render that operation certain, and then, if necessary, substitute a smaller stop which will not make a perceptible difference in lengthening the focus.

(To be continued.)

PHOTOGRAPHY IN THE LAW COURTS.

Notwithstanding the position of photography as essentially one of the arts of peace, it happens from time to time to afford material for the law courts, both civil and criminal, and work for the lawyers. From a report just returned by Mr. Bowen May, Solicitor to the Association of Photographers for the Protection of Copyright, we find that during the last twelve months, the association has had to bring actions in twelve cases, and institute proceedings in three cases in the police court, for the protection of copyrights of members. From another report by the same gentleman to an association with a similar object in regard to engravings, we find that out of one hundred and four cases of piracy of engravings occurring during the last twelve months, not less than ninety-seven were by means of photography.

From Mr. W. Warwick King, whose name is known to many of our readers as a clever amateur photographer, and who is by profession a solicitor, we learn that he has had three cases connected with photography in different courts during the last week. One of these affects a principle which concerns photographers generally, the others are connected with photography, but arise simply out of the ordinary causes of litigation, inexactitude in business transactions on the one hand, and the disposition to shirk engagements on the other.

Fry *v.* Birnstingl.—This case has been repeatedly before the court, and has sufficiently illustrated the "law's delay." Some three years ago, Mr. Samuel Fry entered into a contract with Mr. Birnstingl, to produce fifty instantaneous negatives to print transparencies, for fifty guineas. A few weeks after the contract was made, seventy negatives, taken at Ramsgate, were delivered, from which the fifty were to be selected. Twenty-five pounds on account were then paid, and the settlement for some reason delayed. Upon one excuse or another, Mr. Birnstingl delayed to conclude his part of the contract, by selecting his negatives and paying the balance. He kept all the negatives, and paid no more money. When two years had elapsed, Mr. Fry commenced an action, and obtained a verdict at the Surrey Assizes. The defence was, that the negatives were bad, and that the defendant was willing to have returned the negatives on receiving back the twenty-five pounds he had advanced. Mr. Fry, as we have said, however, obtained a verdict. Then followed various applications to the court from the defendant, which issued in a new trial held on Monday and Tuesday last in the court of Common Pleas, at Guildhall, before Mr. Justice Byles, and a common jury.

For the plaintiff, were Mr. Serjeant Parry and Mr. Day, instructed by Mr. W. W. King; and for the defendant, Mr. Serjeant Petersdorff, and Mr. Foard. The plaintiff stated his case, and exhibited some transparencies he had taken from the negatives before they were delivered, in order to try their quality. Messrs. Sydney Smyth, V. Blanchard, G. Wharton Simpson, Dr. Diamond, Mr. Thornthwaite, and Mr. C. E. Elliott, were called to speak to the value of the negatives. On the other side, the defendant, Mr. Shew, M. Caldesi, and an assistant printer to Mr. England, were called to prove the imperfection of the negatives, and a

number of bad prints on paper were produced to illustrate this point. These gentlemen, however, chiefly insisted on their unsuitability to produce paper prints, which the plaintiff alleged he never intended them to produce. The usual complication and misunderstanding of technical terms, such as negative, positive, transparency, prints, &c., occurred, which well nigh tended, as the judge humorously remarked, to render the whole evidence *negative*. It is worthy of remark, that by far the most clear conception of the bearings of the case, scientific and legal, seemed at once to be formed by the judge, although, when asked by Mr. Fry to examine together a certain negative and positive, his Lordship declined, remarking with a smile, it was quite sufficient for him to endeavour to understand the law of the case, without inquiring into the science. He evinced a marked interest in that portion of the case, notwithstanding, and informed us when we were in the witness box, that he was engaged as counsel in the first case of photographic litigation, Talbot *v.* Laroche. After hearing the witnesses and counsel, both for Mr. Fry and Mr. Burnstingl, and his Lordship's summing up, the jury returned a verdict for the full payment of the balance due for the fifty negatives.

We believe the verdict met the equity of the case; nevertheless, it is probable that it need never have been litigated, certainly could not have involved prolonged litigation, if more prudence had been exercised by both parties at the outset. The contract was worded in a most loose and ambiguous manner, and not carried out with care. Mr. Fry foolishly and unfortunately, instead of delivering fifty negatives which he considered good, delivered seventy which included good and indifferent. Instead of weeding out what he thought least valuable, he left that for the defendant, a person imperfectly informed in photographic matters, to do; when, therefore, the whole lot was shown to persons acquainted with such subjects, they at once said it contained some imperfect negatives, and thus the defendant's suspicions and dissatisfaction were aroused. The presence of these imperfect negatives in court was, moreover, very dangerous, for they were admittedly not good, and a jury might easily have failed to remember that they did not necessarily constitute part of the fifty to be accepted. On the other hand, so far as the defendant was concerned, his position was clearly illegal in retaining the whole of the negatives delivered, accepting none and rejecting none, but declining any decision whatever.

Rouch *v.* How.—This case involves a question of considerable interest to photographers, inasmuch as it defines the character of inventions which may be protected by registration. Mr. Rouch is the proprietor of a tent, or manipulating chamber, which he had registered to protect from imitation. In April, 1859, he first registered a tent contrived by Mr. E. Edwards, and this was known as Edwards' Registered Model Tent. In August, 1861, about six months before the registration had expired, he registered another tent as his own, similar in some respects to the first, but having, as he believed, many improvements. A few months ago, Mr. How produced a tent which he believed to be superior to others in the market. Our readers will find this described, and diagrams, on p. 220 of the present volume, and Mr. Rouch's on p. 532 of our sixth volume. Mr. Rouch conceived Mr. How's tent to be an imitation of his registered tent, and as such an infringement of his copyright. He accordingly summoned Mr. How to appear at the Mansion House, on Tuesday last, to answer as to such infringement.

The case was heard before Mr. Alderman Stone, Mr. Bowen May appearing for Mr. Rouch, and Mr. Webster, a barrister eminent in patent law, instructed by Mr. W. W. King, for Mr. How. Examples of both tents were produced in Court.

Mr. Bowen May, in opening the case, briefly stated the facts, and stated that his client wished for a verdict on the merits, and not on any mere legal technicality. He called Mr. Rouch, who gave evidence to the facts we have stated. He also called a Mr. Wright, who stated that he had made tents for Mr. Rouch, and that he had been sent for by Mr. How, and had made a tent for him; but that he informed him at the time he thought it like Mr. Rouch's tent.

This witness, on cross-examination, stated that he was not asked by Mr. How to make a tent like Mr. Rouch's, but to make one after the pattern furnished by Mr. How, who informed him that he had never seen Mr. Rouch's tent.

Mr. Webster submitted this witness and Mr. Rouch to a lengthened cross-examination, to elicit what was the *differentia* of the two tents registered by Mr. Rouch, in what their respective advantages consisted, and also to elicit the especial points claimed in each as the subject of copyright. Mr. Rouch was repeatedly urged to point out the individual parts of his last registered tent, which were different from the first. In answer he pointed out some, but alleged the difference was chiefly in the principle of construction, which permitted the tent to be erected for use much more rapidly, and gave more convenience, the arrangement of parts being altogether different.

It was on the facts elicited in cross-examination that Mr. Webster grounded his answer chiefly. He objected to the proceeding of the plaintiff in bringing the matter to this court, and thus giving it a quasi-criminal character, when it really involved simply a question of law. The real answer to the case was, however, in the fact that neither of the registrations were worth the paper on which they were written. If the tents possessed any advantages, they were clearly such as could only be protected by a patent; they consisted in combination of parts, and not in design or configuration such as the act contemplated. Design related solely to shape or configuration, and could be represented on a flat surface in two dimensions, and required no references to explain the action of certain parts. Such a thing as the tent exhibited could not be protected by registration, as its claims, whatever they were, consisted in the combination of several parts to produce certain results. There was not a shadow of a claim, therefore, to protection. Even if this were not so, he was prepared with witnesses to prove that his client's tent was no imitation whatever, but possessed merits of its own, quite independent of anything pertaining to the tent of the complainant.

Mr. Webster, in the course of an able speech, gave a very complete exposition of the law pertaining to the registration of designs, which we shall give more at length in our next, as containing information of much interest to photographers.

Mr. Bowen May said that his client was quite willing to decide the question of law in another court, if his worship would state a case for a superior court. Mr. Webster said he must press for a decision here, since the case had been brought in this court, and if it were adverse, then he should appeal to a superior court. Finally, after consulting with his client, Mr. May said he would consent to a dismissal of the summons, which was done accordingly.

ANOTHER MODIFICATION OF THE CARBON PROCESS.

A paper by Mr. Cooper, in our last, referred to another modification of the carbon process, which possesses much interest, and as it will probably become important, a few hints on the best mode of pursuing further experiment in this direction may be useful. We may here take occasion in passing, to mention a thought which this modification has suggested, in reference to the boon which Mr. Swan has recently conferred on photographers, and which some have thoughtlessly undervalued. It has been alleged that as all the principles upon which his process is based, and all the materials he employs have been used in carbon printing before, there is really little novelty in his process, and that but little merit attaches to its inventor. But besides combining and modifying those materials, and adapting those principles with marvellous ingenuity, and producing the first perfect carbon prints we had seen, Mr. Swan was the first to give to the photographic world a completely detailed

process, with full statement of formulæ and manipulations, which at once gave a new impulse to this branch of the art, and rendered successful experiment in carbon printing an easy and familiar operation. Commencing thus from his plainly stated process, modification if not improvement, became an easy thing, and already we have suggestions from amateurs, which are likely to be of great practical importance in simplifying the manipulations without marring the results in this beautiful process.

Mr. Wild's modification, described by Mr. Cooper, consists in substituting paper for collodion in preparing the carbon tissue. Instead of using a film of collodion as a basis for the pigmented gelatine, Mr. Wild uses a sheet of paper; but, by this step, an important advantage is obtained. The tissue, as prepared with the collodion, rendered it necessary that the pigmented gelatine should be sensitive at the time of preparation, and thus made it imperative that it should be constantly prepared fresh for use. Any attempt to excite the tissue by floating on a solution of bichromate, instead of mixing it with the gelatine first, signally failed, as the gelatine and collodion film at once curled up in a hopelessly unmanageable manner. Thus it was impossible to keep the tissue of pigmented gelatine ready prepared, and render it sensitive by a subsequent operation when required. We have reason to believe that Mr. Swan has been for some time engaged in experiments for meeting this difficulty, and it is probable that when his complete specification is published, some contrivance for meeting this difficulty will be found. Mr. Wild's suggestion meets it already. Sheets of paper prepared with pigmented gelatine may be rendered sensitive by floating on a solution of bichromate in the same manner that albumenized is excited on a solution of nitrate of silver. The excited paper is then printed with the gelatine side next the negative. It is next mounted with the side in contact with the mounting paper, and then immersed in warm water, which, dissolving the gelatine, removes the paper which originally sustained it, and the print is developed upon the paper which forms the future basis of the picture.

Whether the resulting picture will in all respects be equal in point of delicacy to that formed upon a substratum of collodion, practice alone will certainly determine. It is probable that gelatine being the material in which the image is formed, delicacy will still be attained. The chief consideration which now demands attention, is as to the best mode of applying the pigmented gelatine to the surface of the paper, and upon this question we may probably derive considerable information from observing the methods already in use, of applying gelatine to the surface of paper for other purposes. There are three methods already employed, one is the plan employed by Mr. Osborne, for applying chromated gelatine to paper, in preparing the photolithographic transfer paper; the second is employed by Col. Sir H. James, in preparing similar transfers for zinc plates; and the third, that employed by professional gelatinizers in coating the surface of prints, &c., for ornamental boxes.

The system of Mr. Osborne appears to us to be the simplest and most efficient. He proceeds as follows, using a solution of about the same proportions as that suggested by Mr. Swan. We will quote his own words:—

"A small tin trough is provided, about eleven inches long, and three inches wide, and one an a half inch deep, into which the gelatinous solution is carefully strained. The trough is made fast to one end of a board, upon which the positive paper is placed, and when the temperature of its contents has fallen to 85° F., the operator, laying hold of a sheet by two adjacent corners, draws it slowly over the trough, while an assistant presses it into contact with the surface of the liquid, by means of a piece of wood of suitable form.

"This is by far the best method of coating paper with gelatinous liquids with which I am acquainted, it is economical, ensures great regularity, and enables the liquid used to be retained at the necessary temperature without difficulty. I believe it would be found useful by the manufacturer of common albumenized paper."

In the preparation of Col. James's transfer paper a much weaker solution is used, not exceeding one ounce of gelatine in sixteen ounces of water. The solution is maintained at a temperature of 100° Fah. in an open dish, and the paper is floated, care being used to avoid air bubbles. The sheet is then dried, and subsequently floated a second time to secure a thicker coating. This process will doubtless produce the result, but with more trouble than the preceding.

The third method involves more trouble, perhaps, than it is necessary to take for the purpose, but will secure the most perfect surface. In the process of glazing prints by means of gelatine, the solution is rarely used stronger than from twenty to thirty grains per ounce; but for this purpose the pigmented gelatine might be used much stronger. When this is ready, and at a temperature of about 100? Fah., proceed as follows:—

Provide a piece of well-polished plate-glass, free from scratches and imperfections, of the required size. After cleansing thoroughly and drying, sponge all over with fresh ox gall. Before the ox gall is dry, pour on it sufficient of the hot solution of gelatine to cover the plate in the same manner as collodion, and put it away to set where it will be free from dust. The time required for setting will depend on the temperature, varying from half-an-hour to a few hours.

When it is sufficiently set—which may be ascertained by gently laying a finger on its surface, which should just retain the impression thus made, without being "tacky"—lay the paper, previously damped, gently on the gelatine, face downwards, pressing it, and taking sufficient care to avoid air-bubbles, which may be pressed out with a paper-knife when they occur; then leave it some hours to harden thoroughly. A penknife may then be run round the edge of the plate, when the gelatine is perfectly dry; it will, if the process has been properly conducted, separate from the glass with ease, and present a highly polished transparent surface.

As we have said before, it is probable that Mr. Osborne's method will be found most expeditious and efficient; we understand, indeed, that it has been adopted successfully by some manufacturers in albumenizing paper. Whichever plan be used, the paper should be first damped, in order to prevent cockling.

In adopting this modification of the carbon process, it may be worthy of consideration, whether gelatine is the best material which can be used with the pigment. Gum arabic would be made more manageable in applying to paper, and we have reason to believe that it would be in much less danger of becoming insoluble by keeping, as in some cases, the gelatine is apt to become when sensitive. It will be remembered that Col. James's first successes in the photo-zincographic rendering of half-tone were obtained with transfer paper, prepared with bichromate and gum, and kept ten days.

There is another point we have omitted to name in connection with this process. Before preparing paper with the pigmented gelatine, it will probably be found desirable to coat the surface with starch or dextrine, so that before the print is developed, the original paper may be easily removed by the solution of the dextrine upon which the pigmented gelatine is laid. Another consideration in connection with this part of the subject must be remembered: great care must be used not to over-expose, so as to render any part of the pigmented gelatine, and especially of the starch or dextrine under it insoluble throughout, and thus so attach it to the original paper, that it cannot be dissolved away.

Before leaving the subject, there is another suggestion we may mention, as to a method of producing two tints in a carbon print, which may, in some cases, be found pleasing. It is already known to our readers that the deepest shadows are formed by the thickest layer of pigmented gelatine. If,

then, the paper were prepared with two or more layers of this pigmented gelatine of different tints, it is clear that the delicate half tints might be rendered in a different colour to the deep shadows. For instance, if the first coat of gelatine and pigment, forming in the finished picture the upper stratum and the deepest shadows, were of a black or brown hue, and the next layer of a warm rosy colour, or fresh tint, we should have a portrait with the shadows and half-tones of the face warm and fleshy, whilst the draperies and deep shadows would be dark. For flowers, &c., the layer forming the deepest tones might be green, and the half-tone layer another tint. For white statuary against a dark ground, the latter might be made warm, and the more delicate shadows of the figure of a suitable grey; and so on a variety of effects might be produced, which might suit decorative, if not art purposes.

As a striking illustration of the same idea occurring to several persons independently, we may mention, that since this was written, but within a couple of days of the time when our last reached the hands of our readers, we have received two communications from gentlemen who have worked out the same experiment as Mr. Wild. Mr. Firliug, of Dorchester, an amateur from whom we have received a communication upon another carbon process, which we shall shortly publish, writes to state that he has also been substituting paper for collodion in Mr. Swan's process, and sends us a couple of the specimens so produced. Mr. Swan also sends us the following note on the subject:—

"Dear Sir,—I see in the News to-day a letter of Mr. Cooper's, suggesting a modification of the process of carbon printing, which I some time ago published. In reference to this proposal, allow me to say that it has, for some time past, been my intention to prepare the non-sensitive tissue which he describes, and preparations are now in progress for its manufacture on a large scale. I enclose a piece of this kind of tissue. I have obtained excellent results by making it sensitive on a 10-grain solution of bichromate of potash, exposing under the negative gelatine, face towards the light, and then, after exposure, mounting the exposed face on a piece of paper, separating the original piece of paper during development or previous to it.

"I quite hope that when the non-sensitive carbo-gelatine paper is supplied to photographers ready prepared, carbon printing will be found as easy in practice as it is excellent in result.

"I ought, perhaps, to add that this form of the process is fully comprehended by my patent.—I am, sir, yours truly,

"Joseph W. Swan.

"*Newcastle, June* 25, 1864."

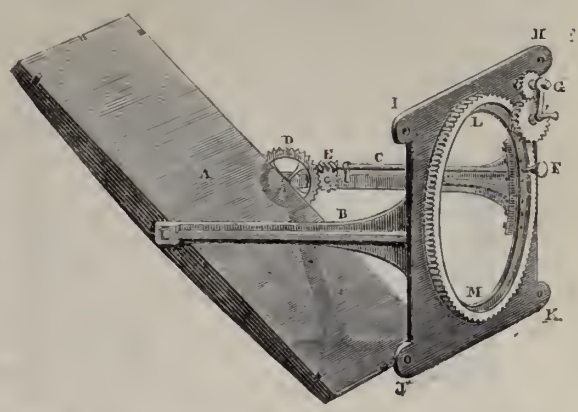
We are glad to find that Mr. Swan's experience confirms our conjectures as to the probable importance of this modification, and we may remark that the example of prepared paper he forwards us possesses an admirable surface, and appears in every way well suited to the process. We hope shortly to have more to say on the subject.

ON A NEW DIALYTIC APPARATUS FOR THE ENLARGEMENT OF PHOTOGRAPHS.

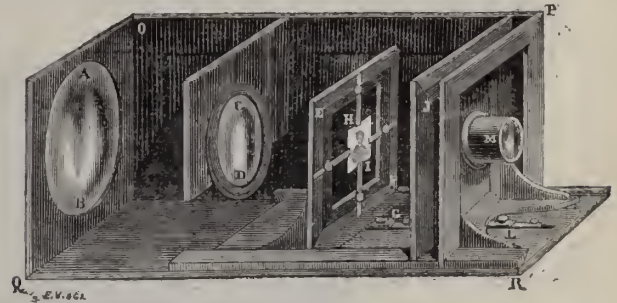
BY DR. VAN MONCKHOVEN.

The new apparatus which we have the honour of submitting to the Society is exempt from the defects mentioned above. It is easily installed in a dark room of 13 to 16 feet long, one of the windows of which has a southern exposure, as represented in fig. 9. The following is a description of the apparatus:—

Fig. 5 is the mirror mounted in an iron frame, and fixed in the shutter of the window. By means of the crank G, and the pinion F, we give it such a position that the solar rays are reflected horizontally upon the condenser of the solar camera. The mirror is very easily managed, it is sufficient to move it every twenty seconds, to keep the solar rays constantly reflected in the same direction.



Figs. 6 and 7 represent the solar camera, properly so called. Fig. 6 shows it with the sides removed, so as to enable the interior to be seen better; and fig. 7 shows the path of the rays through the lenses. The same letters designate the same parts in each illustration.



The lens, A B, is the condenser, which varies in diameter with the power of the apparatus. Its curvature is such that its spherical aberration is reduced to a minimum. At a distance from this lens, equal to its diameter, a second lens, C D, is placed, very thin, so that it may absorb no light (its form is divergent); its object is the *complete* removal of the spherical aberration of the entire system.* The result is, that the illuminated field, instead of being more powerful at the edges of the negative than at the centre, as it is in the old apparatus, is maintained perfectly uniform over the entire surface of the negative; secondly, that a given point of the edges of the negative is traversed by a single luminous ray emanating from the edge of the lighting system, which does not take place in the old system of apparatus, and in this precisely lies the cause of the great delicacy at the edges as well as in the centre of enlarged proofs obtained by the dialytic apparatus. The negative, HI, is cut so as to leave only the portion intended to be enlarged, and is placed in the cone of the solar rays. Hitherto negatives were constantly broken by the enormous heat concentrated upon the central portion only of the negative, the borders of which remained in the shade.

By adopting the arrangement represented in Fig. 8, *no negative is broken.* The negative may be of any dimensions whatever, and the enlarging upon a sheet of paper prepared with chloride of silver of a given size always requires the

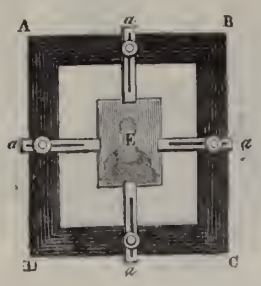
* The numerical data of this combination, expressed in terms of the semi-diameter of the lens, A B, are as follows:—

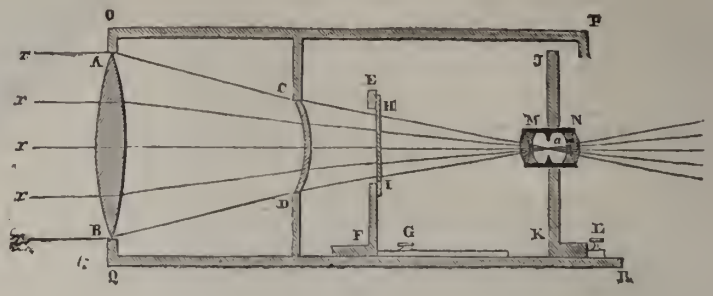
1st surface	R = 2·645	Thickness at the centre 0·193, focal
2nd surface	R′ = 21·639	distance 4·0150.
3rd surface	R″ = 1·083	Thickness at the edges 0·037.
4th surface	R‴ = 1·234	
Distance of the two lenses		2·0075.
Total distance of the combination		4·617.
Index of refraction		= 1·543.
Expression of the aberration		+ 0·001.

same space of time. Thus, you have a negative $\frac{1}{4}$, $\frac{1}{3}$, or carte de visite size; you wish to enlarge the bust only to the natural size upon a double sheet of forty inches, or you wish to enlarge the full figure, from head to foot, upon the same sheet, the enlarging will continue during the same length of time.

think, therefore, that with convergent light suitably employed, the problem of enlarging need not be regarded as insoluble.

I have operated with an apparatus, the condensing lens of which is nineteen inches in diameter, and I have obtained an enlargement upon ordinary albumenized paper of $18 \times 22\frac{1}{2}$





The enlarging lens is of a peculiar construction, and furnished with central or posterior diaphragms, which cut off all the diffused light, but none of the light emanating from the condenser. This is the cause of the brilliancy and relief of the enlargements obtained by the dialytic apparatus. The objectives are moveable, and permit the enlarging of any negative comprised between the one-third and the half of the carte de visite, upon salted albumenized paper, &c., as well as upon collodion. We can also add to this apparatus special enlarging lenses, which will permit of enlarging the negatives $\frac{1}{2}$, $\frac{1}{1}$, &c., and always with the same rapidity and excellence.

inches in from twelve to fifteen minutes. We can, therefore, produce a considerable number of these proofs a day, without having recourse to printing by development, the tones of which are generally cold and without depth.

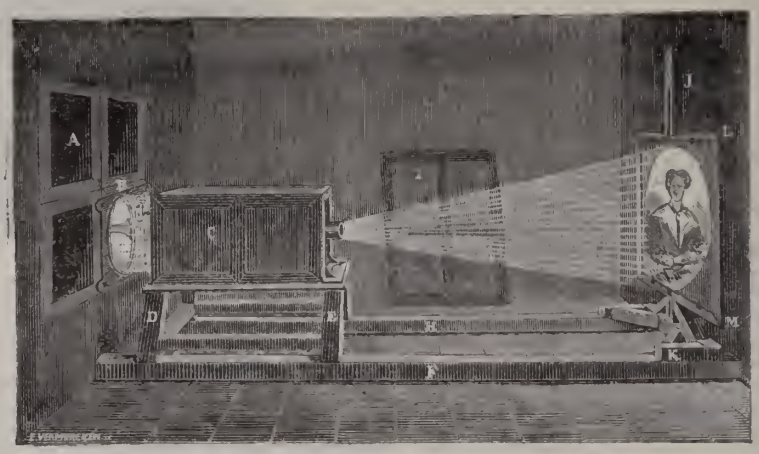


Fig. 9 shows the general arrangement of the apparatus. The reflector B is placed in a blinded window, A; the dialytic solar camera, C, is placed upon the support D; the enlarged image is formed at L M; the distance which separates the solar camera from the frame is ten feet for sheets four feet high, six and a half feet for sheets three feet high, and about three and a quarter feet for sheets of sixteen to twenty inches in height.

This memoir is accompanied by two little negatives, carte de visite size. The first, representing the head of a nun (bust), is enlarged, in several positives, from the carte de visite size to larger than life. In these proofs we may count the hairs of the head, and the smallest details in the skin. The second represents a small view, also enlarged, in positives varying from the carte size up to a sheet 32×24 inches. The finest details of the trees, situated in the horizon, and which occupy less than the twentieth of an inch in the negative, are rendered quite sharp in the positive. I

RESEARCHES ON POSITIVE PRINTING.*

BY MM. DAVANNE AND GIRARD.

CHAPTER VIII.

On the Treatment of Residues.

THE photographer, when he has succeeded in preparing positive pictures, permanent in colour and agreeable in aspect, has, nevertheless, not overcome all the difficulties inseparable from his art: an important problem still remains to be solved by him; his beautiful and permanent proofs must be obtained under the most economical conditions.

Sensitized upon the silver bath, each sheet of paper removes a considerable quantity of the precious metal; exposed, toned, and fixed, they retain only an insignificant proportion: almost the whole of the silver compound is dissolved in the different re-agents employed in its production, and, according to the technical phrase, it is thrown among the residues. It is upon the treatment of these residues, and the extraction of the riches they contain, that the economy of photography, like every other industrial occupation, must depend.

We propose to explain in this chapter the course which,

* Continued from page 221.

in our opinion, ought to be adopted to arrive at this end, and we shall first occupy ourselves by determining with exactitude the important value of photographic residues.

In the course of these researches we have established by direct analysis that each sheet of paper measuring 17×22, when floated on the sensitizing bath, removes from it, partly in the state of nitrate, and partly in the state of chloride and albuminate of silver, a quantity of silver which averages 2·$\frac{333}{1000}$ grammes, or 37 grains, nearly. A preparation on a large scale has enabled us to verify exactly the proportion indicated by analysis. We have seen, in fact, that the preparation of 419 large sheets, measuring 17×22, removed from the sensitizing baths 1·$\frac{555}{1000}$ kilogrammes of nitrate of silver; a quantity which corresponds to 2·$\frac{002}{1000}$ grammes of silver per sheet. This concordance of results is very striking.

On the other hand, when we compared toned proofs with non-toned, we established that upon a large albumenized sheet, similar to those just spoken of, and deeply coloured over its entire surface in consequence of long exposure to the solar rays, the quantity of silver remaining on the sheet after fixing averaged 0·150 gramme (about two grains*). If we apply to these proofs coloured all over, the rule, that in an ordinary proof the total of the whites is equal to the total of the darks, we perceive that the quantity of silver constituting an ordinary proof, upon a large sheet of paper, must be equal on an average to the half of the amount above established, that is to say, to 0·075 gramme (above one grain). Upon comparing this figure with the 2·400 grammes of silver which the proof removes from the sensitizing bath, we arrive at this conclusion, that the silver forming the picture represents about 3 per cent. of the metal employed, and that the 97 other parts dissolved by the various agents employed in the positive operations go to the residues, and very often into the sewer.

The immense extension of the photographic art, during the last few years, has given to these residues a greater value than had been supposed. It would be difficult to determine the total quantity of silver introduced into photographic operating rooms, precise data are wanting on this head; but according to official documents furnished to one of us at the Universal Exhibition, at London, there will be no exaggeration in fixing, for the fabrication of Paris alone, a total of several millions of francs. Of this sum 3 per cent. only is turned to profitable account, 97 per cent. being lost beyond redemption, and without profit to any one, if the photographer neglects to save his residues and extract the metal from them.

For the photographer who follows the usual method in his operations, the liquid and solid substances in which silver accumulates are numerous, and none of them, at least *à priori*, should be neglected.

When the silver bath is exhausted, the dishes and other vessels are washed; these washings must not be neglected. They may be added to the residues, but it will be better to add them to the nitrate bath direct, and make them serve for fresh sensitizings.

When the sheets of sensitized paper are hung up to dry, we place at the lower corner a slip of bibulous paper. These slips should be carefully collected, for they are saturated with strong nitrate of silver.

On removal from the printing frame, each sheet is washed in water to remove the free nitrate; from this source proceeds the most important residue.

Then comes the hyposulphite bath employed for fixing, and the washing waters of the fixed proof.

To these must be added the clippings of the proofs after they are removed from the printing frame, the filtering papers, the kaolin employed for clearing the discoloured bath, and, lastly, the various papers which have been employed to soak up spilled nitrate solution.

The silver is distributed in a very unequal manner among these various substances. This distribution possesses a very great importance in connection with the operations, and we have studied it carefully.

The two following analyses show in what proportion the silver is found distributed by the various manipulations necessitated by the preparation of the positive proofs.

First Analysis.—18 grains, $\frac{800}{1000}$ of silver served for the preparation of 14 half sheets; the silver has been afterwards sought for and weighed in the various residues of the manipulations.

	Weight of silver.	Quantity of silver, per cent.
Draining papers	0·225	1·196
First and second washing waters before toning	10·170	54·090
Bath of hyposulphite of soda after fixing	7·016	37·310
Washing waters of the fixed proofs	0·130	0·696
Cuttings from the proofs after printing	0·300	1·595
Remaining upon the proofs ...	0·582	3·100
Loss, by draining, &c. ...	0·377	2·013
	18·800	100·000

Second Analysis.—43$\frac{75}{100}$ grains of silver served for the preparation of 32 half sheets; the silver was afterwards weighed as follows:—

	Weight of silver.	Quantity of silver, per cent.
Draining papers	0·450	1·028
First and second washing waters before toning	23·133	52·860
Bath of hyposulphite of soda after fixing	14·078	32·100
Washing waters of the fixed proofs	1·800	4·110
Cuttings from the proofs after printing	2·000	4·570
Remaining upon the proofs ...	1·356	3·100
Loss, by draining, &c. ...	0·943	2·232
	43·760	100·000

The two analysis of which we give the results show that the silver employed in the preparation of positive proofs is found distributed as follows:—

About 3 per 100 is found in the finished proof.

About 9 per 100 figure in the solid state in the draining papers, filters, cuttings, and the papers employed to soak up spilled silver solutions, and corresponding to the 2 per cent. loss represented in the two tables given above.

From 50 or 55 per 100 are dissolved in the state of nitrate in the waters, in which the printed proof is washed.

From 30 to 35 per 100 are contained in the fixing bath of hyposulphite of soda.

About 5 per 100, at the most, can be recovered from washing waters of the fixed proofs.

The necessary manipulations for extracting from these various residues the silver they contain, must satisfy three conditions: they must be rapid, economical, and of the greatest simplicity; we hope to succeed in placing them in these three conditions, and to make of the treatment of residues an operation so easy that it may be undertaken by any photographer the least skilled in chemical operations.

(To be continued.)

* Eight experiments gave the following results:—0·170; 0·137; 0·111; 0·172; 0·112; 0·110; 0·154; 0·121 gramme.

PHOTOGRAPHS IN NATURAL COLOURS AT LAST!

We extract the following farcical story from the *American Journal of Photography*:—

Sceptics have asked with a triumphant sneer, what profit has

modern spiritualism been to its devotees to or any of the rest of mankind? The question, if asked again, may be put in a milder tone. Hereafter "oil of pinks," insinuated in the faintest whisper, should quell the most obstreporous unbelief.

The story we are to relate comes to us directly from the principal parties concerned; we have seen some of the documents in the case. Messrs. Brown, Jones, and Robinson, moreover, are known, at least by fame, to most of the readers of this journal. These names, however, are fictitious, the real names of the distinguished photographer, of the amateur, and of the proprietor are—why we have just observed that everybody knows them—and this being so, there is a good excuse for not printing them. If we should print the names in full the gentlemen who bear them would be overwhelmed with correspondence, the now happy possessor of the oil of pinks might, on account of his treasure, be waylaid in the streets, or have his castle stormed by photographers in the guise of banditti. We spare our friends from such embarrassments.

The facts in the case are these:—

About five years since, Miss Smith, a celebrated child (under ten years of age) spiritual medium, was "holding a seance" in the city of Washington. Mr. Johnson, a stranger to those present, being put *en rapport* with the medium, requested the spirit to inform him upon what his friend Brown (unknown to the medium), of Hunker City, was then engaged. The spirit promptly answered—

"He is trying to produce photographs in the natural colours?"

JOHNSON—"Will he succeed?"

SPIRIT—"Not at present. He is not using the right chemicals."

JOHNSON—"Will the spirit inform us what chemicals are needed for the purpose?"

Amid breathless silence, through the astonished medium, the spirit uttered these memorable words:—

"He is now trying chloride of gold and nitrate of uranium, but what he needs is the OIL OF PINKS."

The oil of pinks was a substance unknown to all present. Mr. Johnson therefore enquired where it could be procured?

The SPIRIT—"It is manufactured and sold only by Napoleon Crapeau, No. 240, Rue d'Orgueil, Paris."

After the "seance," Mr. Johnson lost no time in communicating the remarkable revelations to his friend Brown; and, hereupon, Mr. Johnson drops out of our history.

Mr. Brown is a well-known amateur in photography, and a thorough-going spiritualist. He, of course, distinctly remembers that, at the precise time of the "seance," he was profoundly studying the properties of chloride of gold and nitrate of uranium, in view of the problem of the natural colours. But he at once abandons these; his star of hope is the oil of pinks; he dreams that with his pencil dipped in the "silver sunbeam," mingled with the oil of pinks, he paints the rainbow! Unfortunately, the difficulty of procuring the oil of pinks, cares of business, and a serious illness, delayed the practical realization of his dreams, and little progress has been made till recently.

About one year ago, he communicated the message of the spirit to Mr. Jones, a renowned practical photographer. Jones resolved to avail himself of the very first secure opportunity to procure the precious otto. The opportunity soon presented itself. Mr. Robinson, the proprietor of the celebrated Sublime Pagoda of Art on Broadway, who was about to visit Paris, was honoured with the important commission. In due time then Mr. Robinson, in the city of Paris, set out to purchase the oil of pinks. But the fact that success depended upon certain conditions seems to have escaped his mind. He was so dazzled with the splendour of the great capital, that he imbibed the notion of provincials, that Paris is the whole world, and that every citizen knows everything. He enquired among druggists and perfumers, till he was footsore, concerning the oil of pinks: all in vain. Some of the polite merchants regretted that they had "just sold the last drop" (!) but most of them declared they had never heard of such a thing. The happy thought, which should have been the first, occurred at last to our weary friend; egad! he had the address of the manufacturer in his pocket. And now he promptly presents himself at No. 240, Rue d'Orgueil, and behold! Napoleon Crapeau, the inventor, and sole proprietor and manufacturer of the oil of pinks. The treasure, "olei pinkii 1 oz.," cost 50 cts., nestled away securely in the trebly-locked baggage of Mr. Robinson; all go on board ship.

The ship swims like a duck, westward ho! They safely undergo the ordeal of custom-houses and baggage smashers. To make a long story short; the oil of pinks comes to the possession of Mr. Jones; Mr. Jones holds in his hand the glorious destiny of photography, he sees in his mind's eye the most gorgeous display of the colours of Nature. He examined the oil as to its physical qualities. It was new, and peculiar to him; so it was also to the druggists and perfumers, and some of these know a thousand various scents.

Now to use the oil of pinks as a photographic agent. Here is the difficulty; for, is the oil to be used alone or in combination with other photographic chemicals? Has it properties akin to a sensitizer, developer, or fixer? is it for the negative or the print? Jones has his lock and his key, but the spirit has not taught him where is the keyhole. He must needs make empirical trials. He first tries a drop of the oil in the developer for the ordinary negative process: failure! no colours, complete blackness, no image! but not an utter failure, for close scrutiny shows a trace of light and shade. Is it possible that the plate was over-exposed? He tries again with half the time, and now an image, but vastly over-exposed. He adjusts the smallest stop of a globe lens, he aims his camera at his wife sitting under the skylight in the dusky twilight; he removes the cap for only two seconds. He applies the developer with eager but trembling hands, and lo! there starts out, as if an angel from a crystal fountain, the perfect form of his wife. "Eureka!" he shouts—closes the gallery for the night, and lays him down to pleasant dreams. The picture was a negative, perfect in light and shade, but there were no colours. Instantaneous photography was achieved, but no progress in chromatics. And up to the time of this writing little further advance has been made.

A few hours ago Mr. Jones called at our office, and showed us a sheet of paper covered with hieroglyphics, which, he said, was a spiritual communication, supposed to be concerning the oil of pinks. It had not been deciphered, and Jones was on his way to the office of the *Herald of Progress*, to seek some one there skilled in the art to translate it. We await the result with anxiety. Meantime, will the readers of this history please render assistance in the matter? Let the spirits be consulted in all parts of the country. Let suggestions be made and experiments tried everywhere. The grandest discovery of all ages appears to be within our reach!

THE SCIENCE OF A RAY OF LIGHT.—*Continued.**

Progressive Motion of Light.

IT seems now to be a well-authenticated fact that light, whatever it be, whether material or immaterial, moves through space by undulation or otherwise, and has a fixed rate of motion through given media. The rate of this motion through the space in which the solar system is located is about 192,500 miles in a second of time. The discovery of this motion of light was made by methods arising out of certain discrepancies in astronomical calculations. For instance, Jupiter (one of the members of the solar system) has four satellites that revolve very quickly round their primary, and become thus eclipsed almost daily to us on the earth. The times of their periodical revolutions have been accurately calculated in reference to the most minute influences of gravity, and, notwithstanding all this, it was found that very frequently the eclipses of these satellites did not occur at the times prescribed by the calculations. Again, at other times, and for a duration of time, the satellites were eclipsed exactly at the times derived from calculations.

Astronomers were not long in ascertaining the peculiarity of the conditions when there was an agreement between the calculated time and the true time of the occurrence of an eclipse of one of Jupiter's satellites, as also of those in which there was a discrepancy. Thus, when the earth was at E or E′, and was moving in the directions of the arrows at these positions in her orbit, whilst Jupiter was in the position here depicted, the eclipses always occurred at the times derived from calculation. On the contrary, if the earth were moving in the directions of the arrows at E″ and E‴, it always happened that the eclipses did not occur at the times derived from calculation; at E‴ and all along in this region, the eclipses occurred earlier than was expected, whilst on the opposite side of the orbit, when the earth was moving from Jupiter, the time between one eclipse and the next in succession was in every case longer than the calculated time.

By combining all these facts, the very important conclusion was drawn that an eclipse, or any other astronomical phenomenon, occurring at a distance, is an event that is not observed at the time of its occurrence; that such an event is exactly analogous to the birth of another prince in some of the royal houses of Europe; it takes some time for the report to reach our ears, and a longer time to get to California; but a shorter time if we take the express, and hasten towards the port of New York, so as to meet the ship that carries the tidings.

* From *Humphrey's Journal*.

Light is thus analogous to a courier carrying the report with great velocity, whilst the earth in one part of her orbit is equivalent to another courier, slower in motion, hastening in opposite directions to meet the former. In this way the event of an eclipse will be communicated earlier than if the



earth had remained quiescent, if, at the same time, light is endowed with motion in all directions from the centre of its origin; if light had none of this supposed motion, but were an instantaneous impression on the organs of sense, without any reference to distance, then any change of distance between the earth and Jupiter would not produce any discrepancy in the above-mentioned calculations.

The amount of motion of light in a second of time was derived from the difference between the calculated and the apparent occurrence of the eclipses in question. This motion and its amount have been corroborated by another independent method, comprehended under what is denominated "aberration." By means of aberration all the heavenly bodies (even the fixed stars) are displaced visually, that is, they do not occupy the places which they appear to be situated in. This visual displacement cannot be accounted for in any other way than by assigning to light a certain rate of progressive motion, which, combined geometrically with the annual motion of the earth, satisfies all the discrepancies that arose out of stellar displacement.

Rays of light may be compared with the directions of grape shot from the mouth of a cannon, in the following manner:—Suppose, for instance, two soldiers standing ten yards apart are both struck by shot from the same explosion; each ball came direct from the cannon, and the directions, therefore, would cross at the cannon and assign it a position visually in the distant background quite different for two observers in the places of the two soldiers. So with light as it proceeds from a heavenly body: we see this body in the direction of the ray that impinges upon the eye, which, if we ourselves are in rapid motion, is not the same as would have fallen upon the visual organ if we had remained quiescent. As long as the observer moves directly from or towards a luminous body, the latter is not displaced in reference to objects projected upon the background; but in all other directions the aberration is perceptible. The amount of aberration, as we before remarked, gives the same result as that derived from the planets of Jupiter. No other cause has been discovered for the discrepancy and displacement in question; in fact, none have been surmised. It is hence a settled and assumed theory, that *light moves through a definite amount of space, in a given medium, in a given time.*

We derive from this intelligence most wonderful conclusions. Whilst closing the eyelids, light has circumambulated the earth's perimeter; the light that *now* leaves the moon is *now* here, and again is gone to regions far away; some of the light as appearing to proceed from distant stars has been thousands of years, even of ages, in getting here, and thus may be the representative of worlds extinct. Behold! in yonder firmament a new star—it merges for the first time into sight—it moves in space— we decipher its origin by means of parallax and gravity, and pronounce this to be a fact, that the light which now reaches the eye, and makes the star visible, has been ten years or more on the road since it started.

There seems to be something too grand for the conception in the rapidity of motion of light, and the immeasurable distance of created orbs. What we cannot fathom, let us regard with admiration.

2. *Reflection of Light.*

Before we proceed, let us explain a few technical terms used in the discussions of the properties of light.

Light in any homogeneous medium moves in straight lines; the finest imaginable line of light is denominated a *ray;* a number of rays running parallel and in juxtaposition is called a *beam* of light.

If a beam is in any way constricted in a part of its course into a small point, by which means the rays are made to converge or come together in that point, we call such an assemblage of rays either a *convergent or divergent pencil* of light, according to its direction. The line which passes through the middle of such a pencil, that is, the central ray, is denominated the *axis* of the pencil.

Any point of matter which emits light, either by incandescence, phosphorescence, or electricity, receives the appellation of *radiant.* The incandescent sun, a kerosene flame, an electric spark, are all regarded as radiants.

Bodies that permit other sorts of matter, and their forms to be seen and distinguished through them, are said to be *transparent;* if light passes through them, and we cannot distinguish the forms of objects through their masses, they are said to be *translucent;* if, finally, no light passes through a body, it is said to be *opaque.*

When light passes through a body, it is said to be *transmitted;* if it merely strikes against a surface, without passing through the same, it is partly *absorbed and lost,* and partly *reflected* again into space.

The smoother the surface, other things being the same, the greater the quantity of light which is reflected.

Any ray of light falling upon a body at any angle whatever is denominated an *impingent* ray or the *ray of incidence;* the ray which is reflected is denominated the *reflected ray;* if the light passes through the material, the ray, when it leaves this material, is called the *emergent* ray.

If a perpendicular be drawn to the point of impact of any ray, then the angle comprehended between this perpendicular and the impingent ray is called the *angle of incidence;* and the angle comprehended between the same perpendicular and the reflected ray is called the *angle of reflection.*

The angle contained between the self-same perpendicular continued through a transparent medium and the ray of light as it proceeds in the medium, is called the *angle of refraction;* it is called, however, the *angle of emergence* when the ray leaves one medium and enters another.

A line perpendicular to any transparent medium in the centre of one of its opposite surfaces, is called the *axis* of that medium.

The point where any radiant is located is called a *focus;* the *principal focus* is that point to which parallel rays are made to converge, either by reflection or otherwise. The term is used in reference to any opaque or transparent medium by which light is reflected or transmitted.

Other technical terms will be explained as we proceed.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 29th June, 1864.

At the last meeting of the French Photographic Society, M. Anthony Thouret, jun., exhibited an enlarged proof, which, though imperfect in many respects, is, nevertheless,

interesting, inasmuch as it was obtained on paper prepared with albumen and chloride of silver, by means of the electric light. The richness of the tones of chloride of silver are not at present equalled by any other agent; but it prints extremely slow, and we have not, I believe, hitherto obtained an enlargement with it by artificial light. M. Thouret's apparatus is M. Foucault's regulator, with a Bunsen battery of fifty large elements. The enlarging apparatus is M. Bertsch's small megascope. The proof is enlarged to four and a half diameters, and exposed three and a half hours. But we must take into account the insufficiency of a first attempt, in which all the light was very far from being turned to account. In fact, the condensing lens transmits in the megascope only the tenth part of the light emitted, and if the parabolic reflector, in course of construction, realized the curves laid down for it, it is evident that 9-10ths of the rays emitted may be introduced into the megascope. This vivid light will permit the whole of the operations being directed to the obtaining greater sharpness. In the first experiment the battery was worked to its full power, the result was too great an extension of the luminous point, a circumstance very unfavourable to sharpness. In fact, the image of the carbon prints in the principal focus of the megascope performed the function of a diaphragm, equivalent to 1-40th of the surface of the objective, while the solar image represented only the 1-1600th part.

Experiment furnished the following data upon the three principal systems of lighting, with regard to rapidity.

In representing unity of time, by the American system, furnished with a condenser, the power of whose surface approaches four times, parallel solar light is represented by two, and the electric light, rendered parallel by a lens, by three; but the substitution of a parabolic reflector for a lens will probably reverse the value of this relation.

Let us remark that, in the American system, the power of the surface being four, the photogenic effect is only two. The rays lost by absorption and reflection, therefore, diminish the apparent power of the condensing lens one-half. So also, to employ the convergent light with advantage, and only in the case where a relative sharpness is sufficient, we must give the preference to the employment of powerful condensers, otherwise the inconveniences of this system are no longer compensated for by an increase of sufficient rapidity.

Dr. Van Monckhoven exhibited a dialytic apparatus for enlargements. He described the principles upon which it was constructed, explained its mechanism, showing the several portions of it. He also exhibited a great many proofs of progressively increasing dimensions upon paper prepared with albumen and chloride of silver. In reply to the question "what time of exposure the proofs required," Dr. Van Monckhoven replied that those of whole plate size required only fifteen minutes' exposure, those double that size, thirty minutes, upon albumen chloride paper.

M. Humbert de Molard remarked that there would be an advantage in operating by the developing process; for his part, he could never understand how a photographer could submit to operations requiring so long a time as that named by M. Van Monckhoven.

M. Davanne remarked that he believed the real practical solution of enlarging resided in the system proposed and defended originally by M. Bertsch, a system which consisted in obtaining, by the enlarging apparatus, a negative magnified to the dimensions desired by the operator, and afterwards submitting this negative to the usual positive printing process.

Several members sustained the opinion emitted by M. Davanne.

M. Humbert de Molard was also of opinion that the employment of enlarged negatives contained the best solution of the question, but he persisted in saying that if photographers wished to obtain direct positive proofs, they must have recourse to the developing process.

M. Van Monckhoven replied that, doubtless, the rapidity with which these proofs were printed, presented many advantages, but that, hitherto, it appeared that proofs obtained by development were not of a very agreeable aspect.

M. Humbert de Molard replied that this obstacle to the method he proposed might be easily removed. He would himself undertake to make known a process by means of which he would obtain proofs by development absolutely similar in colour to the choicest proofs obtained at the present day.

Mr. Osborne has submitted to the Photographic Union of Berlin, a paper on the relief frequently presented by negatives on glass, and he has presented a series of reliefs so obtained, some of which are very vigorous. This communication gave rise to an animated discussion between several members, not only with respect to the priority of the observation, which had been made previously by several operators—but also upon the question of ascertaining if it be possible, and to what extent, to take advantage of it in the reproduction of proofs by typographic printing. "Generally," said Mr. Osborne, "we are tempted to consider negative proofs obtained by ordinary processes as plane surfaces: observation has, however, shown that it is not so, and that proofs of this sort present very sensible hollows and reliefs, especially in those pictures in which the lines are very strong, and possess but few half tones. These hollows are very often sufficiently deep for tinfoil to retain the impression of them. It is quite easy to become satisfied on this point; upon the negative picture placed on a block of plaster, apply a sheet of tinfoil alloyed with lead, and pass the whole through a lithographic press. The glass will break sometimes, but not always. To obtain the impression in all its purity, it is advisable to first moisten the plate with gum arabic, or, with a little tuft of cotton, to remove the pulverulent precipitate that covers it, and which necessarily injures the sharpness of the impression by incrusting it with tin. The gum deadens the relief a little, as we may be convinced by moulding a plate one half of which has been submitted to this preparation. The hollows were however sufficiently marked to be impressed on the paper upon which the sheet of tinfoil was glued in our experiments."

I have seen an imprint of this kind taken upon a proof intensified with pyrogallic acid, and there can be no doubt that it was the intensifying itself that produced the relief. I have seen also other specimens produced with weak negatives not even intensified, and the tin still showed traces of relief, but, as may be supposed, they were very slight, and scarcely visible.

As is well known, analysis reveals the presence of a very feeble quantity of silver in the negatives, and yet we can find in this an explanation of the fact remarked. For the silver constituting our negative proofs is a light and pulverulent mass, quite amorphous and different from the silver of commerce, which is brilliant and compact: a very small quantity of the first forms a considerable bulk, and occupies a much larger space than an equal weight of ordinary silver.

M. Grüne exhibited some positives taken with the double oxide of silver and lead, and they prove that the great question of suppressing nitrate of silver in printing has become nearly solved. M. Grüne has already arrived at a minimum which is far from being devoid of interest. His process rests upon Wöhler's discovery, that, if we precipitate a mixed solution of a salt of lead and a salt of silver by potassa, a yellow precipitate is formed, which is a true alloy of the oxide of the two metals, the excess of potassa not being in a state to react upon the salt of lead, which is but slightly soluble in this reagent. This alloy consisting of 66 parts of oxide of lead, and 34 parts of oxide of silver, is sensitive to the action of light. The paper to which it is applied is printed as rapidly as paper coated with chloride of silver: it yields the most delicate half-tones, and the fixing and toning are effected in the ordinary manner.

In the first experiments a mixture of 2 parts of nitrate of lead, and 1 part of nitrate of silver was precipitated by potassa: the washed precipitate was then washed and spread with a pencil upon unprepared paper, which, dried and

exposed, passed in colour from yellow to black, in the exposed parts. Since the process has been modified, ordinary paper is placed on a bath composed of—

Nitrate of lead	... ...	2½ parts
Nitrate of silver	... ...	1 part
Water	... ...	20 parts

When dried, the paper is floated a second time upon a bath composed of 1 part of potassa dissolved in 30 parts of water.

The paper now becomes yellow-brown: it is dried, and then exposed. Under the luminous action the lights become brownish, but they return to a pure white after fixing by means of hyposulphite of soda. The proofs tone in the gold bath exactly like those upon albumenized paper.

By employing a dilute solution of 1 part nitrate of silver, 2 parts nitrate of lead, and 50 parts water, we also obtain very passable impressions.

The pictures have the brownish hue of most of the proofs obtained with pure nitrate of silver, but are less brilliant.

Photographic Notes and Queries.

Blistered Prints.

Dear Sir,—It is an exceeding rare thing for the writer to be at any time at fault in the course of his positive printing, the tone generally being all that could be desired, with exceedingly pure whites. But within the last few days, "A change has come o'er the spirit of my dream," and my Rive paper, No. 49, blisters to such a degree, that I can easily detach a couple of inches of the film towards the end of the time allotted for fixing! Some years ago I was somewhat annoyed by *small* blisters, but the present ones, although beginning in a very small spot, each one gradually spreads until the whole of them break into each other. I was never thus plagued until recently, when I began to use hypo supplied to me by another chemist. The paper is Sanford's thick Rive, which I have been using for some time. My hypo bath is one of the salt in five of water, but when I reduce the strength to one in seven, the tendency to blister almost disappears.

I enclose a vignette in which you will see the size of the blister, and what is very remarkable, there are brown spots of imperfect fixation wherever the blisters have been large. I shall be glad if you can offer any suggestions on the cause and cure of this annoyance.—Yours, &c. Anti-Blister.

Walton, near Preston, June 27th, 1864.

[There is no trouble at times more persistent than this blistering of the albumen. We know of no certain remedy for it when it is present in any sample of paper. The great difficulty of the inquiry in such a case arises out of the fact that we know so little of the original manufacture of the paper, either as to what enters into the pulp or the size. We have frequently noticed that a yellowish stain, resembling imperfect fixation, remains in the piece where the blisters occurred, as though some decomposition had taken place. Can any of our readers give information as to the remedy?—Ed.]

Talk in the Studio.

Magnesium Wire.—We are happy to be able to inform our readers that the difficulties in the manufacture of magnesium wire are now overcome, and that Messrs. Johnson and Matthey are now in a position to supply the wire in any quantity. Experimentalists will not now, we believe, meet with any further delay.

A Photographic Ghost.—A very remarkable instance of the re-appearance of an erased image was recently shown to us by Mr. Blanchard. A plate carefully cleaned, and having all the appearance of a new glass, was used in obtaining a negative of a painting to be copied. On developing the image, Mr. Blanchard was astounded to see a faint and ghostly image of a lady hovering near the head of the figure just copied. In the completed negative it has a much more ghostly appearance than any of those in the American pretended spirit pictures. At first, Mr. Blanchard was at a loss to account for it, as he did not remember the lady's face at all. Subsequently, he remembered that he had taken the portrait of such a lady some months previously. One of the negatives had been cleaned off, and the glass put away; but notwithstanding the apparent cleanness of the plate, the nucleus of the image had been there sufficiently to admit of development into a visible form.

Photographic Piracy.—A report made to the Association of Photographers for the Protection of Copyright, by Mr. Bowen May, the solicitor, states that the total number of piracy cases placed in the hands of the solicitor, or coming to his knowledge, up to the 31st May, 1864, was twenty-two. To maintain the copyright of the members, it has been necessary to bring actions in twelve cases, and to institute proceedings in the police court on three occasions. In these cases the offenders have paid the damages named by the proprietors of the respective copyrights, and also the expenses incurred, and signed agreements not to offend again, with a penalty in case of breach; and they have destroyed the piratical stock and also the negatives. The total amount of damages recovered and handed over to the members amounts to £74 8s. From another report by the same gentleman, it appears that ninety-seven cases of piracy of engravings, by means of photography, occurred during the year.

The Photo-Automaton Register.—At the exhibition of the Royal Dublin Society now open, we learn that our esteemed correspondent, Mr. Joseph Lewis, contributes some interesting apparatus connected with lithographic and photographic art. The *Dublin Builder* says:—"At stall No. 13, north side, central hall, Mr. Joseph Lewis, 29, Dame Street, exhibits, as inventor, patentee, and printer, three machines.—1. *The Automaton Pentagraph*, an instrument by which lithographs, engravings, and printed matter can be reproduced to any desired scale, larger or smaller, and printed in the altered form from the lithographic stone. Specimens are shown of every variety of work—commercial, engineering, and artistic—to which the invention has been successfully applied, testifying strongly that the work produced by the 'pentagraph' cannot be equalled for excellence and beauty by hand labour. 2. *The Automaton Register.*—This instrument is used in the operation of transmuting impressions or transfers from work on stone into raised blocks to print at the letter-press, whereby the advantages offered by the lithographic process are successfully united with the dexterity and despatch of the letter-press or steam machine. 3. *The Photo-Automaton Register* is a modification of the above machine, and is used in effecting the transference of the photograph to stone or steel plate for printing purposes. The principle involved in these registers offers a facility for the execution of printing surfaces not hitherto possessed, as, for instance, in effecting the transference of a photograph, two or more negatives on glass are taken from the same point of view; these are secured in frames which register with unerring accuracy over each other, whereby the operator can *repeat* the applications of sensitive coatings, exposures, and etchings, until he obtains a satisfactory result; by using several negatives together, pictures are obtained with all the parts developed, as the sky, middle tint, and deep shadows are each impressed from a different negative obtained by varying degrees of exposure. In the conversion of impressions from stone into raised blocks the object is effected by *repeating* one impression over another, until the ink film becomes sufficiently elevated, when a casting is made from it. Another mode is to repeat the impressions on a flat zinc plate, and etching slightly after each impression is made; by this means the fine lines are preserved from the corroding action of the acid, until the broad lights are etched away sufficiently. The patentee prefers this latter mode of operating. A bank note engraving machine is shown at work, reproducing, by automatic action, most elaborate patterns upon stone, from pattern relief plates. A close inspection of this machine will well repay the time. We are pleased to observe that this exhibitor has been able to successfully compete against the importation of continental prints. The idea of embellishing Irish manufactured articles with views, to be found only in Ireland, seems to have been overlooked. How much more becoming to see a box of Irish lace or cambric handkerchiefs surmounted by the 'Dargle' or 'Giant's Causeway,' than some imaginary 'View on the Rhine.' The drawings are sketched from nature, and are furnished to our manufacturers at as low a rate as the imported imaginary trash. These facts fully attest what Irish energy can accomplish."

Bengal Photographic Exhibition.—At a recent exhibition of the Bengal Photographic Society, which, from an able critique, by Lieut.-Col. Beadle, in the *Journal* of that society,

appears to contain many excellent pictures, we learn that Mr. Samuel Bourne obtains a gold medal for the best ten landscapes. Mr. F. Schwarzschild, a gold medal for the best ten portraits; a silver medal to Cap. Taylor for the best ten photographs, Mr McFarlane having withdrawn his competition; Mr. F. Schwarzschild a silver medal for the twelve best cards, and Mr. S. Bourne, a silver medal for the best single photograph taken in India.

NEW PHOTOGRAPHIC JOURNAL.—Photographic journalism is gradually spreading all over the world. A new monthly journal has recently been commenced in Toronto, Canada, called the *Canadian Journal of Photography*.

PHOTO-SCULPTURE.—A joint-stock company is just in course of formation, for the purpose of working Mr. Willeme's patent for producing sculptures by the art of photography. The process is an important and beautiful one; it is only surprising it has required so long a time to obtain attention for it in this country. It is upwards of three years since we first described it in the PHOTOGRAPHIC NEWS.

PHOTOGRAPHY AS AN ART.—The true purpose of this aspect of photography is to raise emotions, or to help remembrances. Art does not consist in bald imitations of nature, although imitation and truthfulness are tests of art. There is a poetry in nature which has to be sought, and which can be found only by those who know what to look for, and how to seize it. The object of art is not to please the eye only, but through the eye to feed the mind, and almost the best quality a picture can have is suggestiveness. As it is a waste of time for persons without ear to cultivate the practice of music, so we would discourage the taking up of photography, merely as a chemical toy, by persons who have none of the picturesque sense which is wanting to make the artist. The works of such persons are nearly useless, and the labour and the money are thrown away. Photography is becoming so common, that we lose sight of wonders. Since the creation, when "God said, Let there be light, and saw that it was good," what discoveries have been made in "the history of light!" Optics and chemistry have been brought together, photography, the offspring of the two sciences, is an agent in the hands of man.—*Bengal Photographic Journal.*

To Correspondents.

TYRO.—We understood your house to have a ridge roof, not the lean-to form which you now describe. The steps you have taken will, doubtless, improve the result. 1. Yes. As a rule, avoid turning the face to the light. 2. The process you describe will, probably, tone quickly, but will be uncertain, and often produce mealiness. See chapter on "Toning," in our YEAR-BOOK. The acetate bath generally works most satisfactorily for warm tones, the lime bath for black tones. 3. A good rolling press will restore the gloss to albumenized prints, somewhat lost by mounting. We are glad to learn that our last answer aided you. It is always our aim that our answers should be short, clear, and to the point.

W. ENQUIRER.—With a south-east light fronting your sitter you will have constant trouble, and we cannot advise you to try it. If you have ground glass it will afford you comparatively very little light, except when the sun shines. If you make the attempt you should have a double sash, one glazed with clear glass for dull weather, and the other with ground glass for sunshine. But, remember, we do not recommend front light at all. If you had sent us a sketch or plan of your house, we could have advised you better.

CIVIL ENGINEER.—In copying engravings, tracings, &c., there is at times a difficulty in securing sufficient intensity to giving pure, and, at the same time, perfectly good blacks. The use of an old collodion, with a full share of pyroxyline, an acid bath, a weak iron developer, with plenty of acetic acid, and subsequent intensification, will generally give the best results. In an article on copying maps, &c., by photolithography, by Mr. Osborne, in 214 of the PHOTOGRAPHIC NEWS, you will find some admirable remarks on the subject of intensifying for this purpose.

HENRY REED.—The sad mealy state of the prints forwarded is due to the action of chlorine. Of the sample of chloride of lime you have, the proportion is evidently too much. It will, probably, work well after it has been kept some time longer. Or you may take an equal quantity of chloride of gold, and an equal quantity of water, and add a few grains of chalk and agitate, then filter and add to the remainder containing the chloride of lime, and after the lapse of a few hours try again. You will find much information on toning baths in our last YEAR-BOOK. The length of time required for toning varies with circumstances, especially varying with the temperature and the strength of the bath. From ten minutes to half an hour will generally produce the result. If a print remain an hour without changing, its case is, generally, hopeless. The negative of your prints has several good qualities, and ought to produce a better print than either of those enclosed. You may become a member of the Photographic Society by being proposed by a member. If you communicate with us before the next meeting, which is in November, we will propose you.

W. C.—The veil, or mist, over your daguerreotype can be easily removed by a person familiar with daguerreotype manipulation; but will require care in unpractised hands. Remove the glass, and gently dust the plate with a soft camel's-hair pencil. Then taking the plate by the corner with a pair of pliers, let the water from a tap flow over it until it run freely without being repelled. Take care not to touch the surface with the fingers. If the water is repelled by the plate, as though the latter were greasy, try a little alcohol. When the surface is evenly wet, take a fresh solution of cyanide of potassium, about 10 grains to the ounce, and flow over the plate; this will remove the veil, &c., in a few seconds: rapidly wash well, and rinse with distilled water. Then dry with the flame of a spirit lamp applied to the back of the plate, assisting the moisture to disappear evenly by blowing on the surface.

T. W. S.—If your silver bath become discoloured after clearing, and before using again, it is probable that it was standing in the light. 2. If you add about 20 grains of nitrate of silver for each sheet of paper used, the bath will be maintained at a good strength. You will find a useful article on the subject, by Mr. Blanchard, in our last YEAR-BOOK. 3. The method of printing on silk is described, by Mr. H. Cooper, on p. 536 of our sixth volume, and in our YEAR-BOOK for 1863. 4. The discolouration of the silver bath is caused by the contact of the albumen, and by a trace of it being dissolved in the bath; the action of light increases this discolouration. 5. Most likely No. 1. Your prints are not bad specimens of the kind of work.

AMATEUR.—The glass picture you enclose is fogged; the cause is an imperfectly cleaned glass and under-exposure. If you wash the free nitrate away before exposure, you materially decrease the sensitiveness of the plate. The print you enclose is not mealy, but the negative is over-intensified. Mealiness is irregular, granular-looking toning. A picture intensified after fixing does not require fixing again.

A DILIGENT STUDENT OF THE NEWS.—We never saw a negative which was quite green, although with some kinds of treatment they become greenish. Your friend is in error, or he is "chaffing" you.

W. C. B.—The disposition on the part of the film to repel the silver solution, and cause it to look as if greasy, is often due to the use of very highly rectified solvents in the collodion. Try adding a drop or two of distilled water to each ounce of collodion.

R. HERON.—A medallion may be used for the purpose. A Stanhope lens may be purchased of most dealers in philosophical instruments.

SKOORE.—You will find in the NEWS, for May 20th, a description of the method of using the magnesium wire for portraiture. There is no work published on the subject.

T. R. LANE.—The circumstance is a very singular one. We have received no communication on the subject. It is probable that individual members will receive an intimation of the fact by letter, rather than by published withdrawal.

FIREFLY.—The engravings in both the works you mention are copyright, and to reproduce by photography, without consent from the publishers, would be piracy.

ALPHA.—The proportion of glycerine to water for preserving the collodion film moist is unimportant. Two parts of water to one of glycerine answer well. Price's glycerine should be used.

J. LEES.—It is difficult to determine which form of roof is absolutely best, as both have advantages. In building a house, we should be determined by the special conveniences of our own case. Other things being equal, we should prefer the ridge or gable roof, but many of the best artists, we know, have the sloping front. This, as you state, becomes a front light, unless the direction in which the light falls is regulated by blinds. The plan, No. 1, gives you 15 feet of side light, of which you could easily spare four or five, and the sloped corners should be glazed, not boarded. The advantage which would be gained by the glass slightly sloped towards the sitter is this: light, when it falls on glass at right angles, goes right through and illuminates all beyond; but if it fall at an other angle, a portion of it is thrown back by reflection, and never enters the room; so, when the glass inclines to the sitter, it is in position for illuminating him with all that passes right through the glass by falling on it at right angles. It is probable that No. 1 might be made to answer every purpose, and you might retain the ridge roof. Mr. Bogardus's plan will, probably, much better suit a climate with constant sunshine for months together, than it would our uncertain light. You need not apologize for asking advice. If we have not quite met your case, write again.

A. C. PAYNE.—It is quite certain that the paper must have been smeared at the back with some other chemical, before or after exciting. It might be before, and not show until it came into contact with the silver solution.

W. ABERDEEN.—We should consider the negative, of which you enclose us a small piece, quite sufficiently intense. Greater intensity would cause hardness. The lighting is not quite satisfactory; but it is possible that from the position of your room you cannot alter it much.

IGNORAMUS.—A saturated solution is as much as the water will dissolve; of carbonate of lime, it is probable less than a grain in each ounce; of chloride of lime, a somewhat uncertain quantity. With such materials it is not a good form of stating the matter. Choose one of the formulæ which is more definitely stated. Chloride of lime is the commercial name for the same article of which the chemical name is hypochlorite of lime.

F. VINCENT.—From further inquiry as to the cause of the black spots in your solar camera prints, there is every reason to believe they are the result of iron spots in the paper.

ERRATUM.—In Major Russell's letter, in our issue of June 17th, in line 31 from the beginning of the letter, for *fairly* read *faintly*.

T. A., S. S. C., and several other correspondents in our next.

Photographs Registered during the Past Week.

MR. P. EWING, Kinross.
- Photograph of Rumbling Bridge, Dunkeld.
- Photograph of Blair Castle.
- Photograph of Old Church of Blair.
- Photograph of Town of Dunkeld.
- Photograph of Duke of Athol's Cottage, Dunkeld.

MR. J. H. KAYE, 57, Argyle Street, Glasgow.
- Portrait of Rev. R. T. Jeffreys.
- Three Portraits of Dr. William Anderson.

MR. A. D. LEWIS, 5, Hind Street, Scott's Wood Road, Newcastle.
- Three Portraits of Rev. Wildon Carr.

MR. J. F. NADDERMIER, Station Street, Walsall.
- Two Photographs of Scholars of Miss Smith's School.

MR. ALFRED HILL, North Place, Ball's Pond.
- Photograph of Ball's Pond Tollgate

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 305.—*July* 8, 1864.

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PROTECTION OF INVENTIONS BY REGISTRATION AND PATENT.

THE proceedings recently instituted by Mr. Rouch for the protection of an imagined copyright in a tent, or manipulating chamber, tend to throw some light upon one or two questions of interest to photographers generally, and to photographic inventors particularly. From Mr. Webster's very able exposition of the law of copyright in design, inventors may ascertain the exact limit of the protection afforded by that law. It may be seen how inadequate is a law of copyright to protect inventors which are legitimately the subject of protection by patent. And the imperfect construction and unsatisfactory administration of the laws for the protection of property in ideas are once more illustrated.

In the first place, it becomes clear from Mr. Webster's exposition of the law, that no invention can be protected under the Copyright Designs Act, except such as come under the term *design*, in the restricted sense it bears in the arts, having reference to shape, configuration or outline. In familiar parlance, a man is sometimes said to design a thing, when it would be more correct to say he contrived it. What pertains to its form, or the form of any of its parts, he may design, but that ceases to be design, in the sense of the Act, which relates to the mode in which the parts work together. A man may design a wheel, or an axle, or a crank &c., and he may register, and protect that design if it be new, but he cannot so protect the engine of which they form part, and which depends for its value upon the combination and working of parts. In photography a man might design and register a bath, or dish, or dipper of any special shape, and these might be protected whether their novelty consisted in beauty or utility, so long as it depended upon their form simply; but a camera, or a changing box, or a manipulating chamber, the advantage or novelty of which consisted in the convenient combination of parts, could receive no protection under this Act, howsoever new or convenient it might be. Its claims do not consist in its outside shape or configuration, and if protected at all, must receive that protection under the patent laws. The fatal admission to Mr. Rouch's claim consisted in his own statement, that his registered tent was different in *principle* to one he had registered before, and that part of its novelty consisted in the arrangement of parts, whereby it was put up more rapidly than the other. These qualities, the working of parts, had nothing whatever to do with design in the sense in which the word is used in the arts, and the registration was not, to use Mr. Webster's words, worth the paper on which it was written.

The whole question at issue, Mr. Webster observed, depended on the difference between copyright and patent-right. Mr. Rouch's tent, registered under a copyright Act, if protected at all, was clearly a proper subject for the protection of patent law. This appears to us indisputable: but we can readily understand how the idea would occur to anyone, that if a particular form of umbrella or lamp could be protected by registration, that a tent might also. There is an anomaly in protecting the configuration of articles of utility by the law of copyright. By the law of copyright, whether relating to literature or the fine arts, it is intended to secure to the author or artist a property in his own ideas. That property is generally so definite and certain that there can rarely be any doubt about its origin. The doctrine of chances does not admit the possibility of two persons independently producing the simplest sonnet identical in every word and line, still less works like the "Iliad," "The Divine Comedy," "The Cid," or "Paradise Lost." The statement would be laughed to scorn in which it was alleged that Raphael and Rubens, even in dealing with the same subject, produced two pictures identical in all their parts. The subjects for protection by copyright are marked and definite, they admit of no doubt as to originality, they can never be produced by two persons independently. Not so, however, with inventions. Nothing is more natural, or likely, than that different persons working with the same materials, and to the same ends, should invent exactly the same contrivances, without any concert whatever. The thing does happen over and over, and necessarily causes one of the difficulties and sources of dissatisfaction in the patent law. That there is a legitimate mode of dealing with such difficulties, we do not doubt; but we refer to the matter here to point out the evil of complicating the law of copyright by the introduction to its protection of matters having so little analogy with the subjects which the law was originally intended to comprehend.

Perhaps the gravest reflection arising out of the recent case is that arising out of the imperfect administration of the law which it illustrates. Mr. Rouch, doubtless, registered his tent in perfect good faith, believing it to be a legitimate subject for the protection which the Designs Act afforded. He prepared his drawings and specification; he paid his fees, and rested content under the ægis of the law. He invokes the aid of the law in a case in which, it is true, we do not think there is any imitation of his tent; but that, at the present moment, is a question of no importance. If the tent of Mr. How, instead of being, as we believe it, an independent invention, quite distinct in many of its features, had been the most servile copy, the law would have afforded Mr. Rouch no protection. His fee for registration is accepted; so it would also have been for a patent; in the first case costing him about £10, in the second, perhaps, £50, without the slightest examination as to the claim of his invention to the protection of the law, or the slightest pledge therefore that any advantage will be secured by the payment of such fees. In the Designs Act, it is true, a certain discretion is vested in the registrar, by which he can, in certain cases,

refuse registration. But this discretionary power is of an uncertain and limited character, and, as we believe, the officer is remunerated in the ratio of the fees received, there is not much temptation to refuse any application for registration which may be made. We submit that, both for the registration of designs and the granting of patents the certificate of a proper tribunal should be obtained to examine the claim, and state, first, whether it be a legitimate subject for the protection of the law; and second, whether it have been forestalled by some former inventor, a due record of which would, of course, be kept.

This is, of course, but one part of the imperfect character and administration of our existing laws for the protection of inventions; but it is one which should render inventors very chary of involving the aid of such laws. It is a source of much gratification to all connected with photography, that the whole character and genius of the art has tended to diffusion, rather than restriction. Many inventions which might easily and profitably have been retained by their originators have been given ungrudgingly for the benefit of the whole fraternity. Of the few patents which have been obtained in connection with photography, few have been capable of being defended, and still fewer have been remunerative.

We do not for one moment here suggest that the labourer is not worthy of his hire, or that he who has patiently at the cost of time, and brains, and money, worked out an invention or discovery, is not entitled to a share of the benefit arising from its use. Yet, looking at the uncertainty attending the operation of the laws, we take this occasion to repeat a caution we have before offered to our readers, against attempting to secure monopoly without being at least well assured of the legitimacy of their claims to the protection contemplated by the law either of patent-right or copyright in design.

Our readers are already familiar with the details of the case of Rouch *v.* How, we here subjoin Mr. Webster's speech, in which, as we have said, the law of the case, and the intention of the Designs Act, are most ably stated. Addressing the magistrate he said :—

SIR,—The case is now ripe for your decision. This is a matter of great public interest. It is all very well for Mr. Rouch to take out registration upon registration, but it is a matter of great inconvenience and annoyance to gentlemen in the same trade, and of especial inconvenience and annoyance to my client to be brought here to attend a summons before a magistrate; and I think it is very much to be regretted that Mr. Rouch, or the gentleman who represents him, in occupying the position, as he says he does, of solicitor to the Photographic Association for the Protection of Photographers against Piracy, and representing that association; I think it is very much to be regretted that he should come here under this statute, thus giving the case a *quasi* criminal character, when they might have tried it by proceedings at common law, or in the county court, in a very much more satisfactory manner than it can be done here. Now it is perfectly well known to Mr. Bowen May, who represents the plaintiff in this case, that there is a very wide distinction between patent right and copyright. Any one of those tents, which are certainly very ingenious combinations, might be made the subject of a patent. A patent of the tent, of the window, of the dish, of the cistern, of the arrangement generally, whereby you may descend from a very complicated to a very simple, apparatus, the whole process of invention being simplification. Of course any one can take out a patent for these if he likes. I am not here for a moment to say that Mr. Rouch may not have invented a useful tent, but I am here to say that Mr. How has invented one which is infinitely more popular and useful, and which is distinguished by a different combination. Now, sir, so far as regards the combination to which Mr. Rouch says he is entitled, this is not a case of combination —this is a case of design. The design Acts are Acts with which you are perfectly familiar, their object being to secure to artists and makers of patterns the value of their talent and ability, that they should have protection for particular designs, which are things essentially dependent on shape or configuration. Shapes are things that can be drawn on a flat surface.

The first Act of Parliament was 6th Victoria, cap. 100, and was for the purpose of securing property in particular patterns, such as the roses and myrtles in carpets and ladies' dresses—very beautiful things certainly; but it turned out that you could have certain designs which could be employed for purposes of utility, but which could not be taken to be for purposes of ornament. In the 5th and 6th Victoria, cap. 100, s. 3, the first Act of Parliament of this class, to which I shall direct your attention, we read :—

(Except for sculpture and other things within the provisions of the several Acts mentioned in the schedule C to this Act annexed), whether such design be applicable to the ornamenting any article of manufacture, or of any substance artificial or natural, or partly artificial and partly natural; and that, whether such design be so applicable for the pattern, or for the shape or configuration, or for the ornament thereof, or for any two or more of such purposes, and by whatever means such design may be so applicable, whether by printing, or by painting, or by embroidery, or by weaving, or by sewing, or by modelling, or by casting, or by embossing, or by engraving, or by staining, or by any other means whatsoever, manual, mechanical, or chemical; separate or combined, be it enacted, &c.

Then, sir, it says "Also applicable to shape or configuration." You might have an elegant table lamp, or different shapes of decanters, or, indeed, various matters in which the ornamenting was in the shape or configuration of whatever it might be. You have nothing at all in that Act of Parliament that was not for the purpose of ornament. The very limit of a design is that it is a thing you can show on a plane surface in two dimensions; and then the outside configuration would be the design of it. That was the law as regarded ornamentation; but then, sir, it turned out that there were a number of things which were useful, but of which it could not be said that they were for ornamentation. A man designed certain bricks or chimney pots of particular shapes, which were supposed to be useful, and for which there was no protection, and therefore the Act of 6th and 7th Victoria was passed, which enacts that—

With regard to any new and original design for any article of manufacture having reference to some purpose of utility, so far as such design shall be for the shape or configuration of such article, and that whether it be for the whole of such shape or configuration, or only for a part thereof, that the proprietor of such design, not previously published within Great Britain and Ireland, or elsewhere, shall have the sole right to apply such design to any article, or to make or sell any article according to such design for the term of three years, to be computed from the time of such design being registered according to this Act (6 and 7 Vict., cap. 65, sec. 2.)

You will observe that the limitation here applies expressly to the shape or configuration.

Gentlemen who do not understand patent law may be in the habit of saying, "Oh! but this is a new design, this is a new combination. I arranged this closet with that cistern, and that tray, and so forth, and it can be put together in one-fourth of the time." Why, sir, that simple expression of Mr. Rouch was an end to this case. It amounted to an admission of its being a thing which is intended to be put together, and that involves in it that it is a new combination of parts; but the object of the statute is simply that the thing to be protected shall be a design, so far as such design shall be for the shape or configuration; therefore, you cannot go one step beyond the Act of Parliament.

I am here to contend that Mr. Rouch could not register the shape and configuration of his box, such as that which I now hold up. But his registration goes on to say that it is a combination of these several parts, which are, in fact, mechanical implements; and, as I have already said, he is limited to shape and configuration. Now, sir, before you to-day the case is reduced to this :—There is Mr. How's tent, and here is the complainant's. Nobody can for a moment say that they are not similar in some respects. I am not here to contend that Mr. Rouch could not register the shape and configuration of that particular outline, but I am here to contend that the registration before us is not worth the paper upon which it is written. Had he said, "My new design is that shape or outline there," then he could have had that design, if that be a design; but even then it has expired, and is now public property, open to all the world; and it is too bad in Mr. Rouch to come here after having had the advantage of the registration for three years—to come here with the same thing slightly altered and registered as a new design. I contend that this is a combination of parts, such as in the Queen *v.* Bessell, 20 L. J. M. C. 177.

Where a design was registered for a new ventilator consisting of an oblong plate of glass fixed in a frame, and was hinged at the top, so as to open and admit the air by means of a screw acted upon by cords passing over its head, and having a half-pane of glass fixed in the lower portion of the frame, in which the ventilating frame moved, so as to prevent a downward draught. The claim of the inventor was stated to be for the general configuration and combination of the parts, none of which, if taken *per se* and apart from the purposes thereof, were new or original.

The conviction took place at Guildhall, and the unfortunate defendant was sent to prison; however, directly it was brought before the Court of Queen's Bench, the conviction was quashed, the Court holding that the invention was not a design for the shape and configuration of an article of manufacture within the 6th and 7th Vict., cap. 68, and, therefore, not the subject of registration. In giving judgment, Mr. Justice Patteson said: "This registration is itself *felo de se*, for it says that the parts taken *per se* are not new or original, but that the general configuration and combination of the parts is alone claimed." This is a case exactly in point, and I submit that the present registration is *felo de se*, and not worth the paper on which it is written.

A design is of necessity, as I said before, a thing which you can show on paper in two dimensions, such as the pattern, on a piece of paper-hangings or carpet, or anything of that sort, in anything that can be shown in outline; but when you have a mechanical arrangement like this, you get a combination of parts, and a thing in which the novelty is in no respect its shape or configuration; and therefore it cannot be registered. A man may, if he likes, draw a design on a piece of paper, and register it as his design; but the moment you begin to combine parts, it ceases to fall under the Designs Act. The law here gives protection simply for the shape or configuration of an article, and not for the combination of parts.

If, sir, you do not decide that this is a design *simpliciter*, it would only be a waste of public time for us to go on; but if you so decide, I am prepared to call a host of photographers and others, to show in the first place, that there is no novelty in the design which is registered, and that it is not a design under the Designs Act; beside which, the period of the first registration has expired, and the design, if such it be, has now become public property; and I am quite ready to take the case elsewhere if it is decided against us, as in that event it certainly will not stop here.

Scientific Gossip.

Undoubtedly, one of the greatest discoveries which is now to be made is the production of cheap electricity. This force, although present in every natural substance, exists in a dual and neutralised condition, and some other force is therefore required to upset the balance and allow the free electricity to make itself evident. Various are the forces which will effect this. In the old electrical machine, now going out of fashion (having been partially superseded by Ruhmkorff's coil), the double nature of the electricity existing in matter is strikingly shown by the mere act of rubbing a silk pad against glass; the positive electricity accumulated with one and the negative with the other, and in a good machine intense sparks could be obtained of either kind. In the voltaic battery, the electricity is evolved from matter by means of the force, chemical action. Zinc is dissolved in the cell of a battery, and near it, in the same liquid, is placed a piece of another metal less easily acted upon by the acids; copper wires being attached to each of these metals, the junction of the other two extremities allows an electric current to pass along them, and by multiplying the battery cells a most intense action can be produced by this method of evolving electricity. Heat is another force which will develop an electric current. The ordinary thermo-electric pile consists of a system of bars of antimony and bismuth connected by alternate ends in a series. With this instrument it is only necessary to heat one set of ends, whilst those on the opposite side remain cool, and a current of electricity will be generated in the instrument, and will pass along wires connected with the final bars of the series. This is an instance of the direct conversion of heat into electricity; the current is, unfortunately, very feeble, and all attempts to increase its power by multiplying the number of antimony and bismuth bars have failed, on account of the very bad conducting power of these metals. Another, although indirect, method of converting heat into electricity has lately been brought before the public, on the large scale, in the form of the electri light, from the magneto-electric machine; the immediate source of the electricity is a series of magnets; but to get the electric power out of these, an armature, surrounded with many coils of insulated wire, as to be rapidly rotated in front of the magnets. This rapid rotation is communicated by a steam-engine, and the steam-engine burns coals; we may, therefore, fairly say that it is heat from these coals which is converted into electricity; unless, indeed, we like to go back with George Stephenson and say that the prime origin is the sun's light and heat which caused the forests to grow, from which our coals are now derived. We have very little doubt that the magneto-electric machine will ultimately come into very general use. The first outlay is certainly a serious consideration, but this once got over, the expense would be merely nominal in large establishments where there is always a certain amount of surplus steam power, and it would not be very much even when a small steam-engine has to be at work to keep the machine going. But notwithstanding all these different sources of electricity there is a great want of cheap power of this kind. There seems to be no doubt that an enormous amount of electricity is given out in the union of a combustible element with oxygen, the proportion of electricity being in an inverse ratio to the atomic weight of the substance burnt. In almost all practical cases, zinc is the element from the oxidation of which the electricity is evolved, and the equivalent of this metal being 32, it requires the solution of that number of parts of the metal to obtain an equivalent of electricity. Zinc, moreover, although by no means an expensive metal, is of sufficiently high a price to render its wholesale consumption in a battery of fifty or sixty cells, a serious item of expense, when it is considered that thirty-two grains of zinc have to be burnt up *in each cell* to decompose nine grains of water. But if we are not satisfied with zinc what are we to use? We have not the entire range of elements to choose from. The substance must be highly electro-positive substance, that is to say, it must be very readily. When, in addition to this, we consider that it must be cheap and have a low equivalent, it is seen that the elements at our disposal are very few. Amongst the metals, those of the alkalies, potassium and sodium, are pre-eminently suitable, as far as regards electro-positive position. Indeed, so powerful is the affinity of sodium for oxygen, and so intense is the current generated by its solution in water, or an acid, that even at its present price of 10s. per pound, it has been supposed by eminent electricians that it could be advantageously employed, in some cases, as a source of electrical power. But the employment of sodium at present as an electro-motive power is, for general purposes, out of the question, and we must look to some other cheap and readily oxidisable element to replace zinc. Iron appears to be almost the only remaining metal which is likely to satisfy the conditions. It would be cheaper than zinc, not only in actual price, but in its having a lower equivalent (28), and many attempts have been made to substitute this metal for the former. There seem, however, to be practical difficulties in the way, and the advantages are not sufficiently great to make it worth while to put up with the inconveniences.

There remains, however, a substance which appears to fulfil, in a most remarkable manner, all the conditions required for the positive element of a battery. With an equivalent, amongst the lowest in the whole range of elementary bodies, and an affinity for oxygen so great that it will tear it away from its compounds with every other element, even from the alkali metals themselves, it is, in price, a hundred-fold cheaper than zinc. We refer to carbon, an element which appears peculiarly suitable for the production of cheap electricity. Besides being highly combustible, it is a good conductor of electricity, a most necessary

condition, without which all its other advantages would go for nothing, for there is little doubt that a large amount of electricity is liberated in the combustion of sulphur or hydrogen, although, from their inability to conduct, it has no chance of accumulating. Carbon is different in this respect, and the only requisite for obtaining the whole of the electrical power, which it is capable of setting in motion, is to burn it or oxidize it in a medium which will also conduct electricity. Experiments have been, for some time past, in progress with the object of obtaining this power in an economical manner. Employing carbon as the positive and platinum as the negative electrode, and having wires from each, connected with a galvanometer, it is seen that powerful currents are generated when the couple dips into strong nitric acid or permanganate of potash; a less powerful current in dilute nitric acid; and a comparatively intense one when the liquid employed is chloric acid or permanganate of potash, acidulated with sulphuric acid. When the carbon-platinum couple is dipped into nitrate of potash in a state of fusion, the current is not very powerful until the temperature approaches redness, but as soon as the carbon begins to oxidize with deflagration, a most intense current is seen to be generated, and the needle is instantly whirled round to its fullest extent. By means of half a dozen such pairs, the nitre being kept in a state of fusion over gas, water is rapidly decomposed. Mr. Gore, of Birmingham, has lately published some experiments which hold out a promise of similar results. He has been experimenting on the electrical relations of metals in fused substances, and has found a mixture of soda, lime, and silver in which carbon is strongly electro-positive to nickel and other negative bodies. The experiments are now being actively pursued by several experimentalists, and we await with interest the results of their labours.

OLD SAWS AND PHOTOGRAPHIC INSTANCES.

BY HENRY P. ROBINSON.

"A couple or two of most sage saws."—*Shakspeare.*

"Proverbs never lead a man astray," is a saying as old as the hills. In a proverb there is more wisdom packed up in a few words, than there is meat in an egg. One or two might afford fit texts for photographic sermons, so here I proceed to preach one.

The literal truth of the well-known saw, "A little chink will let in much light," was never more important to any class of men than to photographers. A chink in the camera or in the dark slide, particularly when it is so small that it is difficult to discover, is a most vexatious trouble. A little white light in the dark room is not, perhaps, quite so troublesome, although it is better avoided, as the yellow rays from the window will sometimes absorb and render them harmless. There are other ways in which a very undesirable light might be thrown on your work. I once myself thought that I was taking very good and clean pictures, but upon being recommended to place a hood in front of my lens, I found that much better, and quicker printing negatives could be produced than those I had been taking before; a very small amount of light having entered through the lens, which acts as a window as well as a ray-condenser, and veiled the shadows, which rendered necessary a more intense development to get vigour, and consequently a longer time in printing, besides causing a little loss in half-tone. Another way in which a little chink might help you to see your work in its proper light is when, after you have thought you have produced your *chef-d'œuvre*, you are told that it is, to say the least of it, a failure. It happens frequently to professional photographers, that the portraits they have been proud of when just taken, are returned by their customers as unlike and worthless. But, on the other hand, it as often occurs, that negatives of which they are ashamed, produce prints which the friends of the sitters look upon as their greatest treasures. This I think is the greatest evil of the two, for it is infinitely better to destroy twenty good pictures than to send out one bad one; the good prints when destroyed are done with, but the bad one rises in judgment against us. "The good we do dies with us, our evil deeds live long." I suppose every photographer who cares for the quality of his work must be horrified when he sees his last year's productions.

Perfect photography, speaking chemically—perfect pictures are another thing—consists in a combination of very little things, any of which to be omitted subtracts just so much from the finished result, making the picture, not bad, but less than perfect, reminding us of another wise saying, "Good is good, but better carries it." It is by observing small facts that great results are obtained. Perhaps one of the most curious instances of small things tending to great ends, is the recent discovery by Dr. Vogel, that iodide of silver is more soluble in a solution of nitrate of silver at 60° than at 80°.

It has been long known that carbonate of lime, the sulphates of lime and soda, and a few other chemical substances, are more soluble in cold than in hot water, but to Dr. Vogel belongs the credit of having first pointed out the application of this law to the photographer's nitrate bath.

For many years photographers have been troubled with those annoying specks called "pinholes" in their negatives, the greatest difficulty about it being that they occurred principally during the hot summer months, apparently quite upsetting the notion that they could be caused by undissolved iodide in the bath, it being generally supposed that heat would assist the solution of iodide and help the nitrate of silver, or the water in which the nitrate was dissolved to take more of it up. This Dr. Vogel found to be the reverse of the fact, and now we know the cause, we can easily apply the remedy.

Mr. Swan opened a little "chink," which let in a flood of light on the carbon process. It might have been a very little chink, but was not the less valuable for that. Carbon printing was impossible before Mr. Swan's process was known. Pretty theories and ugly prints were all that we were favoured with previously; but some of those who snatch at the honours belonging to others have endeavoured to deprive him of the credit of adding the corner stone to the building.

No later than last week, I see there is an attempt made, but not from the usual quarter, to claim a surprising superiority for Mr. Pouncy's pictures over Mr. Swan's. Allowing Mr. Pouncy very great credit for his perseverance and ingenuity, there still remains the unfortunate fact, that the perfection and beauty of Mr. Swan's prints have filled photographers with astonishment, while the only astonishment that Mr. Pouncy causes is, that he should claim so much and show so little.

Mr. Swan should have remembered that "None is so wise, but the fool overtakes him," and should have followed Dr. Hill Norris's very wise example, and have kept the secret of his valuable discovery to himself. It would have been the worse for photography, but better for himself, both in fame and fortune.

"There are a great many men who think that they are as good as anybody else in the world, or, perhaps, as good as everybody else put together," says the author of "The Gentle Life," a book of the most charming essays published in modern times. A writer in a recent number of the News tries to make himself as good, or better than others, by pulling them down to his own level, or rather crushing them beneath him. "Argus" tries to take all credit from Mr. Williams for his exquisite portraits, and more than hints that they are exhibited under false pretences, by suggesting that they owe their merit to the pencil of the artist, and artfully proposes ingenious methods of retouching photographs, so that they might deceive. Does not "Argus" know that *some* photographers are *gentlemen*, and would not commit a fraud if they could? I have by me now several unmounted impressions of Mr. Williams's portraits, precisely as they came out of the water, and nothing can be more beautiful than their

delicate roundness and appearance of finish. This little "chink" throws a light on the fact that some photographers do not know what good work is, and that they have never produced it themselves, or they would believe in it when shown by others. It does not follow for all this, that *all* the so-called untouched pictures are not touched. I am grieved to find, for the sake of the profession to which I belong, that many fraudulent pictures are exhibited by gentlemen that could have afforded to know better.

I have got just one other little proverb to give you before I have done; here it is:—"Were there no fools, bad ware would not pass." I hope there are none of my readers who will think me personal when I quote this old saying; it is strong I know, and there is certainly a great quantity of "bad ware" sold to photographers, so there must be buyers. Only a week or two ago, our greatest optician found worthless lenses inside his own mounts. But to this my proverb scarcely applies, for the most wary may be taken in by a fraud of this kind. But the moral is, when you want a lens, avoid second-hand, and go direct to the maker. It is the "cheap and nasty" that my proverb objects to. I wonder how many sets of apparatus are made and sold in a year, which would not produce a photograph even with the aid of all the societies, and what they cost? They must be sold to those the proverbialist spoke of when he said, "Never had bad workman good tools," although he must have been speaking of those who could not make proper use of the most perfect cameras and lenses, when he said, "An ill labourer quarrels with his instruments."

HINTS FOR A PHOTOGRAPHIC EXCURSION.

BY W. WARWICK KING.

The observations I have to make will, I trust, be deemed acceptable at this season of the year; this windy month of June, so unfavourable to photographers, is drawing to an end, and leading one to hope that we may have some settled weather, so that the trees in our landscape negatives may not present the appearance of continuous blurring. We have been deluged with beautiful photographs of Tintern Abbey, Kenilworth, and other well-known spots. People, of course, are ready buyers of these productions, reflecting, as they do, the greatest credit on the artists, especially Mr. Bedford and Mr. Stephen Thompson; but their repetition is wearisome; I therefore wish to advise photographers to take the trip I am about to describe, as it is, I believe, new. I first discovered its beauties on a pleasant excursion with the Surrey Archæological Society, and hope to go over the ground again with my camera. There is another recommendation, viz., that the places being so easily accessible from London, the journey may be taken at a comparatively trifling expense.

First, then, take a South Eastern Railway ticket to the Chilworth Station; not far from this are many "bits" of country lands peculiar to our English landscape. Bearing off a little to the left, you come to a half-timbered building, with quaint gables and bargeboards, named Tangley Manor. This would form an exquisite subject for a plate. In the herb garden wall are some curious oval openings which are worthy of notice; the effect of the landscape through these is very singular. Leaving this, and passing through the grounds of G. A. C. Godwin Austen, Esq., of Chilworth Manor, in which some good views might be got, we take our way to the chapel of St. Martha, recently restored in excellent taste by the eminent architect, H. Woodyer, Esq. The view from this hill is most extensive, overlooking as it does a vast extent of country, and worthy of notice, though useless for photography. Descending this to the east, you reach Albury. In the village some good views might be got, but it is in Lord Lovaine's park that you may find "bits" in which the artist would revel: ferns growing in the greatest luxuriance; trees of all kinds and sizes; and as you proceed to the lawn you are still more delighted; rising on a hill are no less than three terraces a quarter of a mile each, a small stream runs at the base of this hill, overhung with beautiful trees; in fact for exquisite foliage, I know of no place which can exceed it. The hall is modern, and so is the present church. The old church remains with its massive Norman tower at the intersection of the nave and chancel. The south transept is turned into a mausoleum for the Drummond family. It has been most georgeously decorated from designs of him, of whom no one with any feeling for art can speak without reverence, the late A. Welby Pugin. How this interesting building could have been allowed to be diverted from its sacred use, one cannot imagine. The north porch, with its beautiful bargeboard, would well repay a plate. From the good preservation in which it is, we see the value of English oak, even though fortunately it be unprotected by paint.

Leaving these lovely grounds, in which we might spend days instead of hours, we come to Shiere. There the exquisite, for the most part, early English Church demands our attention. It consists of a nave, chancel, and south aisle, at the eastern ends of which are two good Decorated windows. The tower is surmounted by a lofty shingled broach spire. The old lords of the manor seemed to have loved it, but the present custodians allow it to remain in a state of neglect and Puritanism. The building is on a slight elevation, and the effect of its spire among the trees is very fine, when viewed from the grounds of R. Bray, Esq., grandson of the learned historian of Surrey.

Such is a slight sketch of which, photographically speaking, one may call an unexplored neighbourhood. The objects I have marked out are by no means the only ones worthy of notice; and I think that no one who takes his camera on the route I have suggested, will say that I have overrated the beauty of the scenery, and consequent enjoyment of a day's trip.

PRINTING IN CARBON.

BY H. COOPER JUN.

The method to prepare paper for the new modification of the carbon process, which promises to give the best results, is, as I mentioned in an article a fortnight ago, that adopted on a large scale to glaze the surface of prints, coloured papers, &c., for French plum boxes and other elegant trifles.

The description of this method by the Editor in last week's News, is so lucid and sufficient, that I need not add any more details thereto. There is only one statement that is slightly at variance with my experience, and that of those from whom I obtained my information; that is, the time that should elapse after coating the plate with gelatine, and before laying on the damp paper. The statement is as follows: "The time required for setting will depend on the temperature, varying from half an hour to a few hours." I have found it necessary to allow only a *few minutes* for the setting; in fact, directly the solution has gelatinized, the paper may be placed upon it. A glass triangle, or rod with its two ends bent at right angles, is the neatest appliance for removing air-bubbles, and on no account should the fingers be pressed on the paper before the gelatine is thoroughly dry. The time required for drying will depend upon the heat of the room, and whether a current of air be allowed to pass over it or not. If the plates be placed in a good draught, they will be dry in about twelve hours. A level surface is required on which to place the glasses coated with gelatine, so as to secure an even layer.

A perfectly efficient substitute for levelling stands, is to arrange on a table one or more blocks of wood, or boxes turned upside down, which must be made perfectly level by means of small wedges. For the purpose of ascertaining if the upper surface be horizontal, a very cheap level may be made by procuring a piece of glass tube about twelve inches long, place a cork in one end, then *nearly* fill with coloured water, and close with a cork, cut off both corks quite close, and the level is complete.

Most common gelatines contain a variable quantity of alum, and I need hardly inform my readers that this substance is detrimental in the highest degree to the success of the carbon process, it possessing the property, when combined with a bichromate, of rendering the gelatine insoluble; in fact, changing it to leather. But we can by very simple means get rid of this dangerous enemy, by soaking the gelatine in cold water for ten to twelve hours, occasionally changing the water; this treatment will dissolve out the alum, and any other impurities present that are soluble in water. After draining the excess of water from the swollen gelatine, it is to be dissolved by gentle heat; the gelatine will retain sufficient water to make a solution of the right strength. There is no need of clarifying the gelatine solution by means of coagulated albumen, as I have failed to discover the least benefit from doing so; on the other hand, I have sometimes thought it was a disadvantage.

I am inclined to think that no previous coating of starch or dextrine is required, as I have not noticed any difference in the result when using them.

For sensitizing, a little weaker solution of bichromate than 40 grains to the ounce will be found most pleasant to work with. The gelatinized paper should remain on the bath of bichromate until it no longer repels the solution; if, upon lifting one corner of the paper from the bath, the water runs in greasy streaks, it must be replaced; but should the surface be evenly wetted, it may be carefully removed, and hung up by two corners to dry. This drying will take from two to three hours, and great care must be taken not to attempt to use it whilst the surface is at all tacky, or the loss of the negative will be the consequence.

After exposing and mounting, place the print in *cold* water for some minutes, when the paper originally attached to the gelatine can be easily lifted away, and the picture then developed in warm water. If warm water be used in the first instance, it is with the greatest difficulty that the paper can be removed without its tearing away detached portions of the gelatine.

Theoretically, the pictures produced by the new modification, should be sharper than by Mr. Swan's method, as, in the former case, there is no collodion film intervening between the negative and the surface to be printed upon.

I heard a gentleman, who had successfully practised the Fargier process, state that the definition was superior to that given by Mr. Swan's, for the reason just stated. When Mr. Swan read his paper on the carbon process, at a meeting of the Photographic Society of London, a gentleman present asked what was the use of the collodion. The question excited laughter, and a member replied that it played the very important part of sustaining the image, and that, without it, the film would fall to pieces. By coating the plate with ox gall, I have succeeded in obtaining perfect prints without the use of collodion at all.

In the last number of the News, the Editor suggested that gum arabic would be very suitable for the new modification of the carbon process.

I was at first of the same opinion, but we had both overlooked the important consideration, that gum is not soluble in cold water, so that it could not be sensitized by floating on a bath of bichromate without ruining the surface. For this reason I am afraid we shall have to continue the use of gelatine, as it is the only suitable substance that is soluble in warm water and not in cold, but *permeated by the latter*.

A few days back I made an interesting experiment in transferring negatives; I accidentally routed out a tannin negative taken nearly two years ago, and which had not been varnished. Anxious to see if it could be transferred successfully, I moistened it with diluted alcohol; and having treated a collodionized sheet of gelatine and glycerine in the same manner, placed them in contact, and when dry easily removed the gelatine film with the negative upon it. Next week I hope to have something to say on the application of carbon printing to articles of jewellery, &c.

(To be continued.)

ON THE FORMATION OF POSITIVE PROOFS.

REPORT PRESENTED TO THE "ACADEMIE DES SCIENCES."

BY MM. DAVANNE AND GIRARD.

Photographic pictures, especially those designated by the name of positive proofs, are the result of remarkable transformations, which are often considered anomalies for want of being studied. At every fresh operation, it may be said, that we see vary, within excessive limits, the colour, sharpness, intensity, and durability of the products obtained, without the cause of these variations being apparent. Hitherto inexplicable, these transformations must, nevertheless, be classed among ordinary reactions. This is what we have endeavoured to show in the long series of researches we have pursued during the past ten years.

To produce a proof, the operator takes a sheet of paper coated with albumen, gelatine, or starch, impregnated with a soluble chloride, and afterwards submitted to the sensitizing action of a solution of silver. The paper is then ready to be submitted to the influence of the solar rays; placed under a negative, it reproduces, in a reversed condition, the most delicate details. At this moment it is very brilliant, but its splendour would vanish if the operator did not fix it by means of reagents capable of dissolving the salts of silver unacted upon by light, and its colour would be limited to the red tones which the picture acquires in contact with the fixing agent, if, in the last place, it were not submitted to the action of colouring liquids, to which the name of *toning agents* has been given.

These several operations all demand the examination of the chemist; we have followed them step by step, and each one has revealed to us new facts, which we now proceed to give a brief summary of.

The Paper.—It is well known to photographers that proofs prepared under exactly the same conditions, but upon papers of different origin, acquire extremely different hues. We have found the cause of this phenomenon in the influence of the sizing of the photographic papers. A proof upon unsized paper is always, upon removal from the fixing solution, flat and grey: upon albumen, gelatine, or starched paper, it always acquires red and brilliant tones, the vigour of which increases with the abundance of the sizing. In this case a combination is formed between the silver compounds and the sizing, and this combination, a real lake colour, maintains its influence to the termination of the proof. This fact is easily shown in a direct manner: a mixture of nitrate and chloride of silver exposed for a long time to light, then treated with hyposulphite of soda, leaves a grey metallic powder as a residue: while an absolutely similar mixture to which albumen, gelatine, or starch is added, furnishes, under the same circumstances, a substance which gradually dries under the form of a brilliant red varnish, in which analysis indicates the presence of carbon, hydrogen, and nitrogen.

This argentico-organic lake plays a considerable part in the production of a photographic picture, and we shall have fresh occasion to appreciate its importance, when we examine the causes to which the fading of the proofs must be attributed.

On the Salting.—The first operation to which the positive paper is submitted is to imbibe a soluble chloride; for this purpose, chloride of sodium is generally employed, but some operators have recommended various other chlorides, attributing special qualities to each. We have shown that the differences in the mode of action presented by these chlorides is more apparent than real, and is due solely to the excess of acid, with which these salts are impregnated. With any chloride whatever, we can obtain various colours: mixed with an excess of acid or of alkali, this chloride will always giver a redder hue than if it were employed in a perfectly neutral state, and this result finds a natural explanation in the normal action of the acids and alkalies upon the organic matters employed in the sizing.

On Sensitizing.—Chlorided and dried, the paper is next

floated upon a bath of nitrate of silver; three things are then accomplished, and the sensitive surface, on leaving the bath, is found to be formed of chloride of silver, a combination of gelatine, albumen, or starch, with nitrate of silver; and, lastly, with free nitrate of silver, in great excess. The presence of these three substances is indispensable to the formation of a good picture; chloride of silver alone yields only a tarnished grey picture, the brilliancy of which is heightened by the nitrate; the argentico-organic combination impresses its characteristic colouring upon this image. The sensitizing bath may be of various degrees of strength: we have carefully studied the influence of these variations in its strength; it may be alkaline, acid, or neutral. In the first two cases the effect is the same as if acid or alkali had been added to the chloride bath; the cause is also the same.

On the Exposure.—To determine what takes place, under the luminous action, on the sensitive surface, whose composition we have established, is, of a certainty, in a theoretical point of view, the most important point in the researches we undertook. It is generally admitted that chloride of silver, submitted to the action of the solar rays, undergoes a partial decomposition, and liberates a portion of the chlorine it contains; but, in truth, the question is much more complex than it appears at first view, and we must ascertain, not only what becomes of the chlorine, but also what becomes of the argentico-organic compound, and the free nitrate of silver.

Let us first consider the chloride: it was for a long time believed that the light converted the chloride of silver into sub-chloride, Ag^2Cl; we have shown that such is not the case, and we admit that portions of the chloride attacked by light are completely separated into their elements, leaving, after exposure, only metallic silver. We have established this capital point by showing—first, that the residue of the luminous action upon the chloride of silver is soluble in nitric acid, while the essential character of the sub-chloride Ag^2Cl is insoluble in this reagent; and, afterwards, that this residue, freed by hyposulphite of soda from the non-reduced chloride of silver, contains no traces of chlorine.

It is true, it has been objected that in this manner of viewing it, the hyposulphite of soda employed as a fixing agent had, perhaps, decomposed the sub-chloride Ag^2Cl into chlorine and metallic silver; but the only reliable experiment instanced in support of this manner of viewing it consists in the change in colour that the exposed proof undergoes in contact with the fixing agent; and we shall soon show, when speaking of *fixing*, that this change in colour is the effect of quite another cause, and must be considered simply as a phenomenon of the hydratation of the argentico-organic lake, a hydratation which it is easy to realize by exposing the printed proof to the vapour of boiling water. The chloride of silver is then transformed under the luminous action into chlorine and metallic silver.

It is the disengagement of the chlorine produced by this decomposition which explains the important part played by the free nitrate of silver in the positive proof. Thus, as we have already stated, a proof in chloride of silver alone is always flat, and without effect: in presence of an excess of nitrate it acquires, on the contrary, great brilliancy. This result is easily explained; for the luminous action, when exercised upon a uniform surface of chloride of silver, is soon limited by the opaque coating produced by the superficial reduction of the argentic compounds.

But if this compound be mixed with free nitrate of silver, beside the portions reduced, and under the influence of the chlorine they liberate, fresh quantities of chloride are formed, which the light may subsequently reach, because previously, in the state of nitrate, these quantities occupied such a place that the reduced silver did not cover them. So that, instead of a flat image, it thus forms successive planes which give that depth to the picture which it ought to possess.

At the same time that the chloride of silver is reduced to the metallic state, the argentico-organic combination is also decomposed, it is reduced and forms a sort of insoluble lake, to which the pictures owes the red lines it subsequently assumes upon contact with the fixing agents.

It is the application of these agents, and the operation designated by the term *fixing*, that opens the second phase of operations required by the positive proof.

(To be continued.)

TREATMENT OF PHOTOGRAPHIC PAPER*.

Sensitizing—Toning—Fixing.

PAPER FOR PHOTODIAPHANIE.

Silver Bath.—Strength = 1 : 5.—Float the paper on the bath two minutes; dry as usual. The exposure cannot be too prolonged; the shadows must be completely metallized, the half-tones have a bronze green line, and the high lights brownish. As with albumen prints, the proofs must be washed before being put into the toning bath.

Toning Bath.—The usual baths must be employed, but the toning must be closely watched, on account of the extreme vigour of the proofs which do not permit of our following the tones easily. By withdrawing the proofs from the bath, when they have attained a violet blue hue, they became blue black; if they are taken out when they are violet red, we obtain the purple brown hues. Before fixing, the proof are immersed in distilled water; and it is then that the transfer film which completely dissolves in the hyposulphite bath, begins to rise.

Hyposulphite of Soda.—Strength = 41 : 5. The mucilaginous pellicle detaches itself from the paper only when the liquid is agitated, and we withdraw the latter from the bath. After about ten minutes, the proofs are fixed, and cautiously placed in water; then washed, renewing the water frequently, and with much care, and leave them until the moment of transfer; the film, which was at first very tender, has now become quite elastic.

Transferring.—The surface to which the film is transferred must be well cleaned. The transfer is made under water, in such manner that the object be placed under the film, and raising the latter as it is lifted out of the water. We give a suitable position to the film, by stretching and extending the parts desired; when it is dry, it unites with the subjacent surface. To protect the picture, it is covered with a varnish specially adapted for the purpose. With an eraser or scissors we remove the useless portions of the film, to correspond with the forms and dimensions of the object covered. If the film does not apply itself exactly to round or uneven surfaces, the film and its support must be moistened with a mixture of one part of acetic acid and six parts water, and washed with plenty of water, when the film has attained the desired degree of elasticity.

KALOCHROME PAPER.

This paper, of a new and peculiar preparation, is remarkable for the extreme facility with which it receives the impression of light; it is specially adapted for reproductions of engravings and architectural objects, on account of the extreme vigour and delicacy of tone it acquires in the alkaline chloride of gold bath. The paper is floated five minutes upon a slightly acid nitrate of silver bath, strength 1 : 8, after drying and exposure, during which bronzed shades soon appear. The picture is first washed in water, changed several times, and afterwards immersed five or ten minutes in a toning bath consisting of

Chloride of gold	1 part
Bicarbonate of soda	10 parts
Acetate of soda	30 „
Distilled water	2000 „

This quantity is sufficient for six sheets 18 by 24 inches.

Care must be taken to let the proof take as deep a tone of

* *Bulletin Belge.*

blue as possible, and then fix it in hyposulphite of soda, strength I : 8. Then wash and dry it in the usual manner.

Kalochrome paper, compared with other preparations, presents the advantage of a hard surface, completely homogeneous, and unaltered in aqueous solutions. These qualities give a guarantee of infinite durability to proofs upon kalochrome paper, which is particularly adapted to portraits of large dimensions, but it endures retouching very well, and the rolling-press imparts a very agreeable gloss. Lastly, kalochrome paper is of such facile use, and so simple, that failure never need be feared.

PHOTOGRAPHS OF A FEW CELEBRATED ARTISTS.

Smith is justly perhaps regarded a good artist; his light is just right; he times a picture to the fraction of a second; has just the right degree of sharpness; the tone is admirable. He well depicts Flora McFlimsey, whose vain look no circumstances could change; and Miss G., the haughty belle, who expects for her picture the same homage herself everywhere exacts; and the actors and actresses, whose vocation requires them daily to make their faces masks, meet pictures for the public gaze.

But these are but of those who wish to test Smith's artistic skill; and while he is a good artist, he is a fussy, nervous man, while he fidgets about in a most uncomfortable manner, until if his victim—for such he is made to feel himself—is at all nervous and excitable, he becomes as little like himself as possible.

To him comes Lizzie Greene, a lady of blushing sixteen, whose sprightly countenance is not devoid of beauty, but she is shy and sensitive withal, and by the time Smith, with much ado, has made her "move her head a little," "place her hands in a different position—not thus, but so;" "raise her chin a little, a little more, not quite so much," &c.; poor little Lizzie, anxious to please Smith and her friends, and conscious she shall do neither, presents a picture as careworn and anxious as that of her maiden aunt.

Smith cannot, to use an expressive phrase, let well enough alone, and when Alice Graves seats herself with her usual sweet, grave face, suggests to her to "look pleasant," "smile a little," and her truly sensitive face is reflected with a silly smile.

Good farmer Gibbs, yielding to the importunities of his children and friends, enters Smith's gallery, "to sit for a picter."

Already suffering an awkward constraint from a collar extra starched for the occasion, creaking boots, and his best suit brushed to an extraordinary degree of nicety, Smith's numerous injunctions speedily remove any vestige of ease he had remaining, and as he places his head in the head-rest, which Smith screws to the position which suits his idea of a right one, his countenance assumes the expression of a man who has made up his mind to undergo some severe surgical operation. Thus Farmer Gibbs' benevolent face goes to his unknown relatives as that of a stern ill-natured man. On hinting this to Smith, he is assured "it is the natural expression of his features when in repose;" and the kind-hearted man tries to believe that his face in repose belies his character.

But the poor little children! what tortures are inflicted on the dear little innocents, who are so unfortunate as to fall into Smith's hands! The result is more easily imagined than described.

Jones, on the other hand, has wonderful success in taking children's miniatures; he only waits for them to get quiet, and then having everything previously in readiness, withdraws the cap and times the picture, and, as with young children, every attitude they assume is a natural one, his likenesses of them are admirable. But Jones is an easy, careless, good-natured soul, and allows older persons, as well as children, to take whatever position they choose, regardless of effect; he never offers any suggestions, but in their presence ignores the fact that any attitude, or any colour, or style of dress, can mar the effect of a picture, consequently few of his pictures are without something offensive to good taste.

Brown avoids the errors of both these. He has a quick eye to detect any disarrangement of dress, or awkwardness of position, coolly and quietly, as it were a matter of course, adjusts the dress, suggests or adroitly allures the sitter into a better position, without in the least disconcerting him, and with a ready perception of character, skilfully places him at ease. Thus his pictures combine, with good execution, an accurate life-like likeness, which renders them superior to those of Smith or Jones. And is not skill as needful to a good artist as thorough knowledge of photographic work?

The photographer may not, like other artists, make the subjects with which he has to deal the mere outlines of the picture to which the skilful touches of his practised hand shall give symmetry and beauty. His province is with the real not the ideal. It is his art skilfully, discriminatingly, delicately to act on the living picture he is to transcribe, so that of all the great variety, each may be best delineated that is most in accordance with nature. Before him is the living object, which, with very few auxiliaries, the truth-telling sunbeam depicts as it at the moment actually appears, and this it is on which the eye of affection must dwell, as the miniature of father, mother, sister, wife, or friend, which, perchance, when the portals of the tomb have for ever shut from view the beloved original, shall be fondly cherished by affectionate hearts as a memorial of the dear departed. Deem no one, therefore, unreasonable who is not gratified with a mere caricature where love demands a vivid likeness, nor a sitter possessed of inordinate vanity, who is not willing to have his phiz take its place in the album of a dozen or more friends as its ugliest. "Likey likey," to be sure is not always "likey handsome," and no reasonable person will expect a plain face to look beautifully in a picture, but what he does desire and expect is the prevailing, or, at least, an often seen, expression; and how few enter the artist's room with this, yet with most a little ready tact on the part of the operator would soon place them at ease, and light the countenance with a characteristic expression.—*American Journal of Photography.*

A NEW INTENSIFYING PROCESS.

BY P. C. DUCHOCHOIS.*

It occurred to me a few days since, that a combination of the chlorides of mercury and platinum would have useful properties as a strengthener for negatives. Accordingly, I made the trial, and I found my expectations more than realized. The chlorides in question readily combine and form a definite and crystallizable salt. It is only necessary to mix them in solution in equivalent proportions, and the double chloride is at once produced. For photographic purposes, however, a slight variation from that proportion would not be noticeable.

For a trial of this intensifier, I would recommend to take seven grains of bichloride of mercury and nine grains of bichloride of platinum. Each should be dissolved in a small quantity of water, and then the two solutions be mixed. The bulk should now be made up with water to twenty ounces, and it is ready for use. The strength may be varied from according to the judgment of the operator; some may find it too strong, others too weak. The strengthening takes place promptly, and is of an agreeable colour. I have adopted this preparation in my practice.

A NEW METHOD OF RECTIFYING THE NITRATE BATH.

BY CHARLES A. SEELY.†

The process of sunning the bath as a remedy for fogginess, introduced by myself, has now been in use for six years. It has been successfully resorted to by nearly all photographers, and is now one of the most approved and certain remedies. The fact, however, that a considerable time of sunning is required for a complete cure is often a serious inconvenience; unless the sun shines, the method, of course, is impracticable.

I have, therefore, lately turned my attention to the subject with the view of finding a more efficient extemporaneous

* From the *American Journal of Photography.*

† Read at a meeting of the American Photographical Society, June 13th.

remedy than those ordinarily resorted to. The process I now recommend is as follows:—

I place the disordered bath in an evaporating dish, add sufficient of a strong solution of caustic potassa to produce a slight precipitate, and then heat to the boiling point over a brisk fire. As soon as the boiling point is reached, add one ounce of water to each ounce of bath; stir well, and remove from the fire to cool. When the whole is cold, the injurious organic matter, together with the excess of iodide of silver, will be found in the form of a dirty precipitate at the bottom of the dish. The bath is fit for use on decanting or filtration, and then adding a drop of acid, and strengthening with nitrate of silver, if necessary. When practicable, the cooling should take place in direct sunlight, as thus another agent is brought into play to make the operation more certain.

The rationale of the process is easy understood. The organic matter, partly set free from combination with, or solution in, the bath, is almost completely precipitated under the assisting action of the heat; during the cooling, the excess of iodide of silver gradually subsiding, carries down with it any injurious properties which might remain.

I offer this to the society and the profession as a very convenient rapid process for rectifying greatly disordered baths.

STEREOSCOPIC PICTURES.

MEANS OF VERIFYING THE ANGULAR DISTANCE OF THE TWO STEREOGRAPHS TO PRODUCE CORRECT RELIEF.

When we take general views for the stereoscope, it generally happens that the distance between the two objectives of a binocular camera is insufficient to obtain suitable relief, and this inconvenience also exists, even when the objectives are mounted upon moveable slides, which permit of our increasing the distance an inch or so. In such cases, we must pose twice with the binocular camera, as we do with the single lens camera. But this resource fails when we require to take instantaneous proofs, and no other course remains to be taken, in this particular case, than to select the station in such way as to have the foregrounds very little apart; then the usual distance of the two objectives of the binocular camera is sufficient to produce a satisfactory relief. But if general views, taken at a single pose, often fail in relief, it is otherwise when we take portraits, works of arts, &c., or any kind of object at a short distance in the glass room. This kind of proof sometimes presents great exaggerations of relief, which produce detestable effects. If it be a portrait, all the parts placed in front are exaggerated, the features are deformed, and the head seems separated from the neck. A judicious photographer will succeed at last in obtaining proofs exempt from these defects, but complete success follows many unlucky failures. The employment of the binocular camera does not permit of our appreciating the relief upon a negative proof placed in the ordinary stereoscope; it is then only after having printed a positive, and changed the two pictures, that we can examine the effect of the relief.

If the photographer arranges a positive proof *before* producing the negative, all difficulty will vanish, and the two factors of relief will be placed in proper relation before exposing the sensitive plate. The process we are about to describe procures this advantage, since it permits of our *seeing in relief* the two pictures depicted in the ground glass of the binocular camera.

Suppose that, after focussing, we look at the pictures through the two prismatic lenses of a stereoscope; superposition will be obtained, but it will produce no sensation of relief. For, as we know, to produce relief, the two pictures must intermingle. But, if in lieu of the optical apparatus of the common stereoscope, we employ the *reflecting* stereoscope prisms of M. Duboscq, the impression of relief is immediately obtained.

To facilitate the examination of the picture, we adjust it by means of a small mirror, inclined at an angle of 45° to the ground glass, and look at it through the reflecting prisms in a vertical direction. The mirror is held in a little box opposite the ground glass. A rectangular aperture is made in the back of the box opposite the ground glass. The upper portion presents two circular apertures, the centres of which are the same distance from each other as the optical axes of the stereoscopic lenses. It is through these two apertures that we look at the pictures reflected in the inclined mirror. In the construction of this instrument it would be proper for the lenses placed in front of the reflecting prisms to be of shorter focus than those in the stereoscope. —*Bulletin Belge de la Photographie.*

Correspondence.

THE ORIGIN OF THE CARBON PROCESS.

Sir,—I think your remarks in reference to the merits of Mr. Pouncy's process are as favourable as you believe, notwithstanding their being accompanied by ifs and buts, as though you would raise some unknown objections against the process. Mr. Pouncy has never had full justice done him by the photographic press, not even by the Photographic News. You say that Mr. Swan's process is as it professes to be (*query*, where?), a modification of Poitevin's process, of which Mr. Pouncy's former process was also a modification. In answer to this assertion, I repeat Mr. Pouncy produced the first carbon print, therefore, I acknowledge no previous process, until you can show me prints prior to his. It is easy to assert the existence of such processes after once known, but not so easy at first to be discovered, None could stand an egg upon its end until Columbus cut off the tip and stood it up, then everybody could do so too; so with the production of carbon prints, after Mr. Pouncy gave to the world the first formula respecting such process.

When the Society of France awarded Mr. Pouncy a silver medal and 400 francs for his first prints, how was it Mr. Poitevin did not exhibit carbon prints? simply because he had none; I am aware he had a medal, but for what? no one knows.

2. With reference to Niepce, I am aware that Niepce and Daguerre experimented with bitumen on metal plates, glass, &c., and abandoned it for the daguerreotype, or silver plate; did they ever produce a perfect photograph on paper in printer's ink or bitumen, that which Mr. Pouncy's process includes?

3. You admit that Mr. Pouncy's process is simple and easy in manipulation, but the exposure is longer. Grant it; does not the fact of the ink paper keeping its sensitive qualities any length of time before its exposure, and the keeping of it any time after exposure, before developing, more than compensate for long exposure?

4. You also state the impossibility of pictures, by this process, being equal to silver prints, in consequence of the nature of the materials. I have before me a silver print and a carbon, and am fully prepared to assert the carbon to be equal to the silver in every particular. As to the nature of the materials, you remind me of a letter that appeared in this journal, in one of its early numbers, in which the writer attempted to prove that if the first carbon process of Mr. Pouncy's was worked at for twenty years, it would be impossible to get pictures equal to silver, because atoms of carbon could not be brought sufficiently fine; what then can be the difference between the nature of the materials used by Messrs. Swan and Pouncy? I think, in examining the two processes and the materials, Mr. Pouncy's is certainly the most favourable, on account of the fineness of the compound used, it being of a oily nature, which is invariably smoother than a water solution of colouring matter.

5. It is impossible for me to say what you have seen, but as I have one of Mr. Pouncy's pictures from stone before me, I

again assert that it contains all the gradations that the negative from nature can give; and if you have not seen any such, how can you consistently say I am but little acquainted with the subject.

As one deeply interested in the progress of photography, I appreciate your expressions of regard for this process, and hope it will yet be more fully manifest, together with the photographic press in general.—I am, sir, yours, &c.,

William Tubb.

Grove Street, Southampton.

[You appear to be quite unaware of the history and origin of carbon printing. We have before us, at this moment, M. Poitevin's original specification, entered at the English Patent Office, in December, 1855, in which the carbon process is distinctly set forth. Amongst other particulars, he states:—"I apply various liquid and solid colours upon paper, cloth, glass, and other surfaces, by mixing such colours with the aforesaid mixture of a chromate or bichromate with organic matter (gelatine, albumen, or gum, &c.) and applying this new mixture or combination to the paper, &c. The photographic impression is produced upon this prepared surface by the action of light, and it is then washed with a sponge and a large quantity of water. The albumen or other organic matter is rendered insoluble at the parts where it has been acted upon by the light, and the design is thus produced in the colour which has been employed." A tolerably clear statement of the process, this, we take it. Now this is from two to three years earlier than Mr. Pouncy's first announcement. To ask that we shall show you a print taken at this time is simply a very unnecessary demand, since here is a clear statement of a process by which a print may be produced. 2. In reference to M. Niepce, we have seen a very excellent and permanent print in bitumen produced by him in 1827. 3. The keeping qualities of Mr. Pouncy's paper are very valuable; but we are uncertain as to whether they will compensate commercially for slow production. 4. You mistake us: we have no intention of undervaluing the quality of Mr. Pouncy's prints. We have seen some very fine ones, with all the gradation of silver prints, only lacking a little in purity of colour. We have never asserted that carbon could not render delicate gradations as well as silver. We have never compared the best of Mr. Pouncy's prints with the best silver prints from the same negative, and should not, without such comparison, make any assertion as to exact capabilities of either process. What we did say on the subject was this:—That Mr. Pouncy's process could not, from the nature of the materials, produce the same delicacy as Mr. Swan's. This is very apparent since Mr. Pouncy must print through paper which has always more or less texture; whilst Mr. Swan prints through gelatine or collodion which are without texture. 5. Regarding impressions from stone, we have simply to repeat that we have never seen a photolithograph with anything like the gradation which is possessed by a negative from nature, or by a good silver or carbon print. But mark your inconsistency. You expect *us* and the photographic world to be convinced of the existence of such prints, without proof, simply from your assertion, whilst you deny the priority of M. Poitevin's invention, because *you* never saw a print by it. We argued your slight acquaintance with the subject in which you write so positively, because you deny the priority of a discovery of which there is abundant published documentary evidence. Mr. Pouncy refrained from patenting a process five or six years ago, of which it is quite possible he was an independent discoverer, because he found M. Poitevin had patented it two or three years before him. Once more, we aim to do full justice to Mr. Pouncy's ingenuity and perseverance, and to the excellence of his results, and shall rejoice in his progress. We intend no injustice or slight to him in stating the simple facts as to priority of invention, and in endeavouring to estimate fairly the excellence of the results which come under our notice.—Ed.]

THEORY ON THE NATURE OF LIGHT.

Sir,—After the confession of ignorance as to the nature of light and heat, contained in the extract from the *American Journal* in this week's Photographic News, perhaps the following may be acceptable; you are at liberty to do as you please with it, either to print, or burn it, as the coinage of a diseased imagination.

The earth may be broadly stated to consist of an assemblage of various matters, collected and bound together by a peculiar primary force called cohesive attraction; it floats immersed in a subtle etherial fluid which fills space, the source of which is the sun. It is owing to the antagonistic attractive force of this ether upon the matter of the earth, that all the natural phenomena we see around us is produced. Its dissecting power upon its antagonist, the attractive force of cohesion, shows that this latter is a compound, being composed of two dissimilar fluids, called, when so separated, electricity; it is owing to this circumstance that matter has a tendency to form pairs, cohesive attraction being itself a pair.

The active antagonism of these two primary forces upon matter, produces the phenomena of magnetism and galvanism: magnetism being a state of permanent and antagonistic action between these two forces, without the decomposition of the matter in which it is induced; galvanic action resulting in the decomposition of the matter acted upon, and also of the cohesive force. The following definition of heat and light will, it is thought, clearly explain those phenomena.

Heat is an effect produced by the antagonistic action of the two primary forces of nature upon matter; it increases in intensity in proportion to the increase of energy of this action upon the matter so acted upon, and its capability of undergoing decomposition by the primary force of the sun; as this cabability diminishes, this action ceases. There is this distinction between heat and light, that heat can be developed in matter, whether solid, fluid, or gaseous; light, on the contrary, although an effect produced on matter by the same action of the two primary forces, is only developed when matter assumes the gaseous form; it seems an effect produced by the complete disruption or decomposition of the cohesive force.

Although heat and light cannot be produced without the presence of matter, a certain degree of energy in the antagonistic action of the two primary forces is necessary to their production, as, under certain favourable circumstances, matter is both de- and re-composed without either being appreciably produced.

Matter generally, when undergoing decomposition of its cohesive force, assumes first the fluid, and then the gaseous form; but certain combinations of solid matter are capable, upon the introduction of an exciting cause, of instantly assuming the gaseous form, accompanied by the emission of heat and light, the primary force of the sun being able in these explosive compounds to instantly and completely decompose the cohesive force.

I think there is enough written to show that the subtle operations of nature are not above man's intellect, if he earnestly try to comprehend them; the works of the Creator are not all of them above the comprehensions of the creature he has made in his image.—I am, sir, respectfully yours,

T. A.

Yarmouth, June 25th, 1864.

PHOTOGRAPHIC NOTES AND SUGGESTIONS.

Cyanide of Potassium as a Fixing Agent.—I have used cyanide solely for some years; the advantages it has over hyposulphite of soda are so well known, that I need not repeat them here. One of the chief objections against its use as a negative fixer, is its liability of dissolving the half-tones, and of lowering the intensity generally. In my practice, I have observed that a too strong or too weak solution is objectionable; the former from its eating up the picture

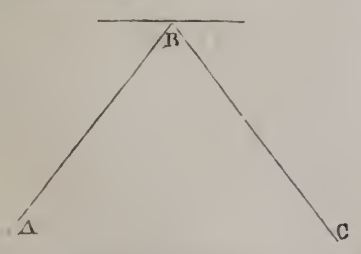
rapidly, the latter from the necessity of keeping it for a long time on the plate. The best result is obtained when the solution is of such a strength as, when poured on the plate, it dissolves the unaltered iodide in a clean sweep—gradually, but tolerably quickly. I pour it on the side of the plate nearest me, and by the time it reaches the other end, two-thirds of the plate is cleared, and the remainder is generally perpectly cleared by the time the plate is drained. I never use the same solution twice, as this would affect the strength of it; for the same reason no definite formula can be given, as several samples of the salt which I have tried vary considerably.

Portraiture.—How long is the *cartes de visite* mania to last? It is excellent in its way, but do you not think it has been a great obstruction to portraiture on a larger scale, and to the improvements that would otherwise have taken place in making lenses for large portraits? At present, the energies of our best opticians seem to be devoted to the improvement of lenses for *cartes de visite* portraits? These portraits are good and cheap, but they are not the best records a family would like to keep of its members. A picture that could be put over the chimney would be my idea of such a record; and I think if photographers would start a large series on plates about 12 × 15 or 12 × 10, that they would soon take. The figures may be full length as in the present *carte de visite* style, or bust only.

If Ross or Dallmeyer would construct a portrait lens to take these pictures *rapidly*, the success would be undoubted.

A portrait lens about 6″ diameter, and 18″ focal length, ought, with a full aperture, to cover a plate 12 × 10 to perfection, and the time ought not to exceed from ten to twenty seconds. What would be the cost of such a lens? The focus is shorter than is usually given to portrait lenses of such a diameter, but would this add much to the expense? If £50 or £60 would cover the cost, it is likely some of the leading photographers would indulge in the luxury. How valuable would be a series of portraits of our eminent men of this size (12 × 10), they would be worth preserving. The price would be rather high at starting, but this would soon right itself. From the large outlay that would be required in the purchase of an apparatus, one advantage would be derived, the production would remain in the hands of photographers of note and repute. Bad lenses may answer for small pictures, but a large portrait must be taken with a good lens.

Use of Mirrors in Photography.—I saw a suggestion in the News for taking landscapes by means of a mirror; the possibility of getting a larger angle was mentioned; I hardly think so. I have been trying some portraits in this way, that is, I have pointed the camera to the image reflected in the glass. There is no advantage to be gained by the use of a mirror; but in focussing, I was struck with a fact that surprised me. Is the image not reflected from the surface of the glass? Why is it then, if you focus the surface of the glass, the figure or image is *not* in focus? I had to turn the lens in considerably to get the image in focus. I did not follow the experiment, but conjecture I had to focus for the distance A B C in the following diagram, instead of the distance A B as I expected:—



I should like to have this explained by some of your correspondents, who have a greater knowledge of optics than I have.

I saw something in taking pictures by this way that would have been an advantage but for this fact, the means of vignetting simply and artistically. The mirror might be oval, and the background (to be placed behind the sitter) of one tint—but the frame in which the mirror is placed, to be enlarged on all sides, and artistically painted according to taste. S. S. C.

[If proper care be used in subsequent washing, we prefer hyposulphite for fixing the negative, as less liable to reduce the image, and as less noxious in the dark room.

The card mania will probably continue for some time yet. Commercially and photographically it has its advantages and disadvantages. It has given a great impetus to professional portraiture, and a good card is after all a very perfect picture. A lens of the diameter and focus you mention would be very difficult to make perfect. As you increase the diameter of the lens, you increase the difficulties of manufacture, especially if short focus have to be secured as well. A lens for large standing figures should have a focus nearly twice as long as that you name, and the diameter might be with advantage an inch less.

There is no advantage in photographing a reflected image; the only object would be to get a smaller image in a short room; but there would be many disadvantages. As the angles of incidence and reflection are equal, it necessarily follows that you focus for a point behind the mirror at an equal distance to that of the object in front of the mirror. —Ed.]

PRINTING ON SILK.

Dear Sir,—In your "Answers to Correspondents," last week, you refer "T. W. S." to an article of mine on page 536 of your sixth volume, for the method of printing on silk. The process which I have found preferable to that referred to, and by which the larger number of the specimens exhibited by me in last year's exhibition were produced, is as follows:—Soak the silk for an hour in a warm solution, composed of 20 ounces of water, from 80 to 100 grains of chloride of sodium, and 60 grains of Iceland moss; dry, and sensitize by soaking for 15 minutes in a 20-grain solution of nitrate of silver. Take a piece of smooth cardboard, rather larger than the silk to be printed upon, and attach the latter to the cardboard by four or five little bits of gummed paper. This will enable the operator to examine the progress of the printing without disturbing the silk.

In ironing the finished prints, care must be taken that too great a heat be not applied, as it would turn the whites yellow. —I am, yours truly, H. Cooper, jun.

Talk in the Studio.

Eggs in New York.—The American *Journal of Photography* states, that upwards of 1,200 dozen of eggs are used weekly in New York, in preparing albumenized paper.

Published Card Pictures.—We understand there is a general movement for a reduction of price, in published card pictures. Original portraits of celebrated persons which have hitherto commanded a retail price of eighteen pence each, are now to be sold for one shilling. Does this indicate a decline in demand, or suggest that there has been over-production producing a glut in the market?

Photographic Reproduction of Ancient Records.—The fashion of reproducing ancient records and documents by photography appears to be growing. It is stated that the charter granted by William the Conqueror to the City of London will be reproduced photographically, for a work to be brought out under the sanction of the Master of the Rolls. The last important reproduction of the kind, a most interesting and important one—Shakspeare's Will—has not, we regret to state, been in so much demand as might legitimately have been anticipated.

The Royal Academy Exhibition.—Our readers should

bear in mind, that the Royal Academy Exhibition is now open day and night.

MR. BLANCHARD'S PRESERVATIVE PROCESS.—Major Gordon writes on this subject as follows:—"In last week's NEWS, I see, in 'Answers to Correspondents,' a remark about Mr. Blanchard's moist process. I have tried, with *invariable* success, Price's glycerine; the honey is, for people living in a town, the most difficult thing to get, as chemists always put some beastly stuff in. I get mine from people who keep bees here—cottagers I mean, who are happily innocent of the adulterating dodges. I find the process slow, as, of necessity, much of the silver is washed off in pouring the solution on, but for interiors it is a capital thing. I have exposed for an hour without the slightest appearance of the film drying."

THE PHOTOGRAPHIC EXHIBITION.—The London correspondent of *Le Moniteur de la Photographie*, reviewing the exhibition now open in Pall Mall, gives to Lady Hawarden, and to Mr. H. P. Robinson, the credit of having produced the *chefs-d'œuvres* of the exhibition. Of Lady Hawarden's best picture, he says, "I have never seen in any collection, French, Belgian, German, Italian or English, anything which can be compared with this study, unless it be a portrait of M. Silvy, by himself, once exhibited in Paris." Of Mr. Robinson's pictures, he says: "They are large and beautiful; photographic landscape has never before attained such a degree of perfection. Two of Mr. Robinson's studies are not only the most beautiful landscapes, but amongst the largest photographs in the exhibition." Excepting the works of Bedford, Claudet, Warren Vernon, Major Gresley, Mr. Annan, and a few others, which are duly appreciated, he regards the bulk of the ordinary photographs as beneath mediocrity.

To Correspondents.

J. H. W.—The spots are caused by imperfect fixation, either from the fixing solution being weak or exhausted, or from imperfect immersion. Possibly air-bubbles have formed, which have prevented the proper contact of the fixing solution with that part of the print. The stain would not show until the action of light and air had brought about a decomposition in the print, causing the yellow discolouration. See that your hypo is sufficiently fresh and strong, and that the prints are perfectly immersed and kept in motion.

S. C. C.—He has commenced again in the same place. You had better write and see what arrangement you can make.

W. C.—There should not be any deposit, if all the articles were pure. It is possible that your acetate of soda may not have been pure. Were your vessels perfectly clean? The gold can be reconverted into chloride by dissolving the precipitate in aqua regia.

D. F.—We believe there is no agency for Dr. Van Monckhoven's improved solar camera yet in this country. The worthy Doctor will be in London himself shortly, we believe, when we will obtain the necessary information.

G. C. H.—The lens you specifically mention will answer your purpose best. 2. Chloride of ammonium, or a mixture of that salt with equal parts of chloride of barium, will give the best results. 3. The use of alcohol in the nitrate bath for exciting paper has been approved by many excellent photographers, as giving immunity from discolouration. Where the paper turns brown in a few hours there is some fault in the paper. 4. Most of the formulæ for toning baths are based on the assumption that the chloride of gold is nearly neutral. When it is not so, there is nothing better for neutralizing it than carbonate of lime. If you use a soluble alkali, you necessarily run a risk of adding too much, as you can never determine the exact quantity to be added, and are in constant danger of adding excess.

R. G.—We have within the last twelve months received several examples of stains, or discolourations, in the excited paper somewhat similar. We have no means of deciding the cause, but are inclined to think that the defect exists in the paper.

C. SOUTAR.—Mr. Scott Archer died in May, 1857. The sum raised for the benefit of his family was about £700; we do not, at this moment, remember how it was appropriated. His first idea, we believe, in using collodion was to improve the surface of paper in taking paper negatives. The first person who used gallic acid in photography was, so far as we know and believe, Mr. Fox Talbot. We shall be glad to see your specimens.

No. 90.—In the passages to which you refer there are some evident errors. Where under-exposed is used, over-exposed, apparently, should have been, and *vice versâ*. What kind of lens do you mean, a single lens or double lens? If a single lens, focus for a very distant object, the sun or moon; and, when sharp, measure the distance between the lens and the ground glass, which will give you the focus of the lens. If a compound lens, get the image of a print on the ground glass exactly the same size as the original, and then measure from the print to the ground glass; one-fourth of the distance is the equivalent focus of the lens. Mr. King's address is 29, Queen Street, Cannon Street, E.C. The stains on your negative arise from keeping the plate a long time out of the bath before developing in hot weather, and are more common with a bath containing organic matter than with a new, pure bath. A piece of damp blotting-paper at the back of the plate, and brought round the edges, will frequently prevent their occurrence.

J. H. S.—We could have formed a much better opinion of the lighting if we had seen one or two examples, than we can from a description. So far as we can judge from an abstract consideration of the case, the slope from A to B is not too great. If too much light reach the background, as you fancy, the blind you propose would prove in some degree a remedy. Whenever you can afford to spare the light it will improve the modelling of the picture, if, at least, two-thirds of the roof light be covered with blinds, allowing the light to reach the sitter thus from a top light at the side of him.

LIX.—Of Atkinson, of Liverpool, for the *American Almanac*, and probably for the others.

IN MEMORIAM.—Mr. Shadbolt is not dead, we are glad to state. It is not, as you remark, customary to write "in memory of" a living man; but there is no accounting for the eccentricities of genius.

BURY.—The greasy appearance you describe most likely arises from the accumulation of ether and alcohol, which the bath acquires from use, and which is removed by evaporation.

AN EAST END PHOTOGRAPHER.—We are obliged for your information, which may be useful to us, although we cannot in this column publish the names of specific makers. The blistering does not arise from the use of nitrate of soda, as it was a common trouble with *Rive* paper long before nitrate of soda had been suggested or tried. We see no reason either for supposing that the use of nitrate of soda in the silver bath would in any way interfere with fixing.

F. L. M.—You may use an iron developer, with a simply iodized collodion, with advantage: it may be weaker than one for bromo-iodized collodion. A bromo-iodized collodion will generally work more rapidly, and be more rapid. 2. Sulphide of potassium blackens the deposit already there, and thus practically increases the opacity of a negative to light, but it does not add to the deposit. It is a little liable to stain. The use of iron and silver, or pyro and silver, is most efficient, as a rule.

J. BELNON.—We ascertain that the numbers you mention are all in print, and copies are, therefore, not required at present.

A. M.—We have posted the letter.

W. CARPENTER.—The numbers shall have our attention.

J. REAY.—So far as we can understand the case, the mottling appears to arise from the film repelling the developer, and so preventing its regular action. The addition of a little alcohol to the developer will, in some cases, prove a remedy; in others, the use of a more porous and absorbent collodion, or the addition of a drop of water per ounce to the collodion. The use of a slightly weaker developer, and skilful agitation of the plate, will sometimes answer. Your print is wanting in shadow. The light is too directly in front, and you intensify a little too much.

DAVID DUNCAN.—Received with thanks. The subject shall have due attention shortly.

GEORGIUS.—When you find very palpable evidence that the silver bath is dissolving the albumen from your albumenized paper, it is proof that it is either too weak or alkaline. If the latter, neutralize with nitric acid, taking care not to add excess. If the former, add silver. The addition of alcohol will tend to prevent the albumen dissolving. About one-sixth or one-eighth of the whole bulk of the bath may be alcohol. When once the albumen is in the bath, it is difficult to remove. Sunning and filtering will effect it; but if you rectify the strength of bath, and decolourize it, you will, probably, find it work all right. 2. As an amateur, printing only one or two prints at a time, you may use your hypo over again, taking care, however, that it does not get acid or exhausted.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. JOHN STUART, Glasgow,
Two Photographs of Rev. A. M'Dougall.

MR. G. OTTLEY, Walworth.
Two Photographs of Rev. Dr. Whitesides.

MESSRS. W. AND D. DOWNEY, Newcastle-on-Tyne,
Photograph of St. Mary's Catholic Church.
Photograph of St. Mary's Catholic Church (Interior).
Photograph of J. Mather, Esq.

MR. S. J. WISEMAN, Southampton,
Photograph of Captain Semmes.
Photograph of Hursley Church.

MR. FRANCIS HERBERT DUFFY,
Photograph of Bath Post Office.

MR. J. H. KAY, 57, Argyle Street, Glasgow,
Photograph of Rev. Dr. Muir, D.D.

MR. JACOB SCHMIDT, New Town, Bristol,
Two Photographs of Rev. T. Hacking.

MR. J. HUDSON, Kingston-upon-Hull,
Photograph of Mr. Jones, of the yacht *Deerhound*.

MR. T. WORDEN, 41, Grainger Street, Newcastle-on-Tyne,
Photograph—View of St. Nicholas Church, Newcastle.
Photograph—View of the Old Castle, Newcastle.
Photograph—View of the New Town Hall, Newcastle.
Photograph—Two Views of Grey Street (Nos. 1 and 3), Newcastle.
Photograph—Two Views of Grainger Street, Newcastle.
Photograph—View of the Theatre Royal, Newcastle.
Photograph—Two Views of the Central Exchange (Interior), Newcastle.
Photograph—View of Pilgrim Street, Newcastle.
Photograph—View of Market Street, Newcastle.
Photograph—View of Hood Street, Newcastle.
Photograph—View of Nelson Street, Newcastle.
Photograph—View of Clayton Street East, Newcastle.
Photograph—View of Big Market, Newcastle.
Photograph—View of Grey Street and Grainger Street, Newcastle.
Photograph—View of Market Street and Grainger Street, Newcastle.

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THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 306.—*July* 15, 1864.

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THE MEDALS IN THE EXHIBITION.

WE are now enabled to announce the decision of the committee, in regard to the award of medals for the best pictures contributed to the present exhibition. It will be remembered that five medals of equal value—silver, we believe, but the metal is not specified—were offered, 1, for the best portrait or portaits; 2, for the best landscape or landscapes; 3, for the best group or groups, or composition or compositions, each from a single negative; 4, for the best architectural subject or subjects; 5, for the best printed impression from a photograph transferred to metal, stone, or other material, and absolutely untouched. The gentlemen forming the committee of award were Mr. Glaisher, Col. Stuart Wortley, Mr. Durham, Mr. Thurston Thompson, and Dr. Diamond. We have before stated that the task of selection and deciding that one was best, where so many were excellent, was a very difficult one; and whilst the fact in no wise diminishes the credit attaching to those who were finally adjudged worthy of the medals, it may temper the disappointment of others who had fondly hoped to secure the coveted distinction. In such case, pre-eminently, failure is no shame, but may be stimulus to further effort.

The decisions are as follows. In regard to portraiture the merits were so equally balanced in the contributions of Mr. Joubert, and Mr. T. R. Williams, but the style of the portraiture in each so essentially different, that, as one of the adjudicators remarked, it was almost like comparing a cow and a horse; each was very perfect of its kind, but the kinds were essentially different. It was felt, therefore, that the justice of the case would be best met by giving a medal to each of these gentlemen. In regard to landscape the difficulty of decision was even greater, as the uniformity of excellence was more extended. Some of the very best contributions were, unfortunately for their owners, retouched, and that most needlessly. These were of necessity placed out of the competition. The final balance of advantages was found in the pictures of Major Gresley, and to him the landscape medal was awarded. The medal for the best composition from a single negative was awarded to Vicountess Hawarden. In regard to architectural subjects the committee declined to make any award, as none of the contributions were considered of sufficient excellence to merit the distinction of a medal. In regard to photographs produced by the aid of the printing press, the photolithographs of Mr. Toovey, of Brussels, were considered to be the most perfect pictures exhibited, and to these the medal was awarded.

It is probable that no award which could be made would give universal satisfaction, as there will ever be differences of opinion as to what constitutes superior excellence in the examples of each kind exhibited. In this we cannot say that we are entirely satisfied with the result; but we must admit that we think the decisions will, in the main, give general satisfaction. The committee of adjudication was constituted of gentlemen, who would be regarded *à priori* as pre-eminently fitted for the task. It included gentlemen of high eminence in art, science, and in different branches of practical photography, who were members of the council of the society, and not contributors to the exhibition, together with the secretary, who has excelled in all branches of photography. But the offer of prizes was of too narrow and limited a character. If prizes be given at all, they should, we think, comprise at least two orders of merit, a first and a second in each department, as the experience in the present selection has shown. Why not offer a silver and a bronze medal in each class? It can very rarely happen that one picture of any kind possesses such surpassing excellence that nothing else approaches it, and having with difficulty selected the best picture for the first medal, surely there will be some other approaching so near in merit, that it might very properly have a second medal. Of course, it will be urged that in any case the line must be drawn somewhere, but that is no argument for drawing it with unnecessary abruptness.

But the scope of the medals should be much more comprehensive. It is very well to encourage those departments of the art which are easy, profitable, or pleasant, and are, therefore, certain to be practised. Portraiture generally pays; landscape photography is pleasant, and sometimes profitable; architectural photography is easy, and often profitable. These are certain to be practised, whether they are encouraged or not. Nevertheless, let them have medals by all means. But there are other branches of the art which are perhaps less profitable, or, if profitable, more difficult, and which, it appears to us, require the fostering aid of a society's encouragement in the shape of honorary distinctions for success. A medal has been given, it is true, for press photography; but one medal is not enough. There are two distinct and important branches in this department, that which belongs to reproduction of engravings, &c., which is least difficult but most important, and that which aims to reproduce by the printing press photographs from nature, which is by far the most difficult.

Then there should be a medal for the best carbon process; we say process, because it should not be for the best print simply, but for the best print by the simplest means. Mr. Swan, who, as we have before said, was the first to make experiment in carbon printing simple and practical, and also produced the best carbon prints in this country, exhibits: but there is no medal to distinguish his merits. There should be a medal for combination printing. This is neither a remunerative nor an easy branch of photography, and whatever may be thought of its present success, is at least a bold and praiseworthy attempt to extend its art capabilities. Mr. Robinson contributes this year a most charming composition of this kind, which has won from painters of very

high rank the encomium of being the most perfect photographic *picture* ever produced; but an express provision is made to cut such a composition from the competition.

There should be a medal for the best instantaneous picture. Instantaneous photography is one of the most important and interesting branches of photography, as well as one of the most difficult in which to attain perfect success. There should be a medal for the best enlargement, whether by solar camera or otherwise. There should be a medal for the best dry plate picture. There is not more than one dry plate picture in the exhibition. Dry processes have not, of course, gone entirely out of use. But perfect success is difficult to attain with them, and there does not appear to have been sufficient inducement to any one to send such pictures as can be obtained with dry plates. Yet, to obtain a perfect dry plate process, is surely sufficiently desirable to encourage effort by the offer of a medal. There should be a medal for the best reproduction from an oil painting. This is one of the most important and most difficult branches of photography, and one in which, in this country, we are behind other nations. In France, this method of reproducing pictures for publication is fast superseding engraving, to the mutual advantage of the painter, the photographer, and the public.

There might be a medal for the best specimen of printing by any process, whether by development, by direct sun printing on albumenized paper or plain paper, by iron or by carbon, &c., &c. There might be a medal for the best picture, or for the best dozen pictures. There might be a medal for the most important new application of photography. There might be a medal for the best microscopic photograph, the best astronomical photograph, or the best photographic enamel, &c.

It should be a condition that the process by which each successful picture was produced should be described in detail. The cost of the medal need not be great, if the greater number were bronze; but if the cost were an element in the consideration, the report of the awards, with the details of the processes, might be made, by publication on a separate form, to contribute largely to the expense of the prizes. We believe that by a judicious expansion of the medal system, much of the objections held by some to the award of prizes at all might be met, and a renewed impetus given to the Society, to the exhibition, and to the art.

HINTS ON THE USE OF STOPS.*

Compound or Portrait Lenses.—Many of the facts relating to single lenses are true of compound lenses; but, in some respects, essentially different rules obtain. With the portrait lens, as with the view lens, the stop is used to correct defects: by its position it modifies the character of the image and the curvature of the field, and by its size it modifies the character of the definition. But, whilst in a single lens the stop is absolutely necessary to correct spherical aberration, in the compound lens it is possible to approximate closely to absolute correction and obtain a perfect focus on a single plane, so that a stop is not necessary to improve the definition in that plane. The effect of the stop on the definition of a perfectly corrected compound lens is to extend it more evenly over a flat plate, and to increase its depth of definition, bringing into satisfactory focus objects placed at different distances from the lens.

The Position of the Stop is generally between the front and back lenses of the combination. The advantages of this position are various: if the form of the lenses be that usually employed, and the stop be placed at a point between the front and back lens, the distance from each being proportionate to their foci, the image will be free from distortion. Suppose, for instance, the front lens of a portrait combination have a focus of six inches, and the back lens a focus of twelve inches, and the amount of separation between the lenses be one inch and a half; then the position of the stop must be, in order to prevent distortion, half an inch from the front lens and an inch from the back lens, the distance in front and behind the stop having the same relation as the foci of the respective lenses. This is the best position for the stop, in order to prevent distortion, and it also secures a maximum of some of the other advantages of a stop, with the least loss of light. But it is not necessarily the best position for securing all other qualities. If flatness of field be the aim, it will be better secured by placing the stop nearer to the front lens, and best of all by placing it in contact with the anterior surface of the front lens.

At first sight this last statement will appear to some readers to be an anomaly. We have already stated that approaching the stop to the front surface of the single lens, increased the curvature of the field, and increased the area of illumination. We now state that bringing the stop into contact with front surface of a compound lens, flattens the field, and decreases the area of illumination. The operation is really the same in both cases, but the conditions are different, where two lenses are thus employed. The reader will more readily understand the real action by regarding for a moment the back lens of the combination as the equivalent of the single lens. It will then be seen that as the stop is removed further from it, the field is flattened, and the area of illumination circumscribed as in the single lens. The time of exposure is of course more prolonged by a stop in this position, than by one of the same aperture between the lenses. Placed here it practically circumscribes the acting portion of the front lens, and relatively increases the acting power of the back lens, and this has the effect of flattening the field.

The presence of the stop in front of the lens also serves another very important purpose, besides flattening the field. When double combinations are used for landscape purpose, and are pointed towards the light, having at the same time a small central stop, a foggy spot of light is often seen in the centre of the field, which is very tantalizing and annoying. This is often caused by reflections from the front lens. remedy generally proposed in the shape of a black annulus on the posterior surface of the front lens only proves partially successful. From a recent more careful examination of the subject, we ascertain that a certain remedy is the use of a stop in contact with the front lens. This prevents the reflections in question, and proves a certain remedy.

Where rapidity of action, and at the same time the maximum of correction, both as regards distortion and definition are required, a central stop will give the best result. But where a flat field, as in copying, or in standing figures, or with some architectural subjects, is required; or where, in landscape work, the lens is pointed towards the light, and there is danger of producing a central spot of light, and where a slight curtailment of the field is not an objection, then the stop in contact with the front lens, either alone or in combination with a central stop, will be found to give the best result. Perhaps the best plan in such a case is to commence by using a front stop, as small as the nature of the case will permit. It will be found, however, that reducing the size of the aperture in a front stop, circumscribes the field more and more as the aperture is made smaller. When, therefore, it is found that the limits of the field do not permit of further reduction of the front stop then a central stop of a still smaller aperture, may be inserted to obtain further correction, and also to secure freedom from distortion.

The Size of the Stop will be regulated by the same conditions already adverted to as govern its size with the single lens. The reduction of aperture here, as in the single lens, improves imperfect definition. With a perfectly corrected lens, it does not improve the definition which is already good on a single plane, but it increases the depth of that definition, or makes it include a greater number of planes. It also equalizes it over a flat field, thus improving the marginal definition. If the lens be imperfectly corrected

* Continued from p. 314.

it improves the whole quality of the definition by attenuating the pencils, and practically giving them a fine point instead of a blunt one, with which to do their work.

The Depth of Definition is of course affected by the same cause, and in like manner. If the subject be a large head in portraiture, the stop will bring the tips of the ears and the nose into focus at the same time, which, if the lens were a perfectly corrected one, having a good focus only on one plane, would, with a large angular aperture have been hopelessly out of focus. With a similar lens the accessories and background of a card picture would be out of focus, and the stop would be required to render them with tolerable definition; and to secure anything like modelling in the large head or avoid imperfect definition in all but a small piece in the middle of a card picture, the reduction of the aperture will be necessary in what is regarded as a perfectly corrected lens: whilst if the lens be imperfectly corrected, the stop will be required to get crispness of definition, and avoid fuzziness.

The undue reduction of the aperture has, however, the same objections here as in the case of the single lens. The loss of light is in the definite ratio of the reduction of aperture, the increase in the time of exposure being in the square of the decrease of aperture. This, in portraiture, is a serious detriment, as rapidity of action is the main element in securing good expression. Undue reduction of aperture, moreover, has the same tendency to destroy relief and boldness, giving a flat effect to the picture, however well lighted and defined. This is largely destructive of the art qualities of a picture. These considerations bring us to a very important question, which has doubtless occurred to some of our less experienced readers. We have been speaking of the effect of stops in producing the various qualities which photographers require in a lens. We have referred to their action in correcting distortion, in flattening the field, in equalizing illumination, in improving marginal definition, in giving crispness of definition, in giving depth of focus. If these results are brought about by the use of stops, what, it may naturally be asked, is the difference between a good and bad lens? And what is the object of giving a high price for the instrument of a skilled optician, rather than a low price for one made by nobody knows whom?

We stated at the outset that the action of stops was always corrective; always intended to remove some defect. If the photographer be content to use a sufficiently small stop, and to adapt his subject to the requirements of his lens, he may secure a moderately good picture with almost any kind of lens. A small aperture in the right place is a wonderful corrective. But for every advantage gained, there is, as we have explained, something lost; the exposure is prolonged, and relief is destroyed; and with a bad lens, the aperture must be so small, as to bring about the maximum of these disadvantages. The more perfectly corrected the lens, the larger the aperture with which it may be worked for securing perfect definition, and hence the more rapid it will be in action, and the more bold and relieved its images.

Let it be distinctly understood, then, as we stated at the outset, that the use of stops is a valuable power in the hands of the photographer for correcting certain shortcomings in a lens; but that the best lens is that which will give the best results with the largest stop, and that the highest skilled optician is he who constructs a lens which gives the best pictorial definition with the largest aperture, and which does its work with the shortest exposure.

THE PHOTOGRAPHIC EXHIBITION.

Portraiture.

The first number we find in the catalogue is a frame of card portraits by M. Claudet. These pictures illustrate very strikingly, as do most of M. Claudet's photographs, the fact that every artist of any distinctive taste or character invariably stamps that character upon his productions, and notwithstanding the alleged mechanical character of the art, the artist can stamp his style on his work. The remark is not a new one; we have made it before; but we are especially reminded of it by these pictures. Those who remember the daguerreotypes of M. Claudet will be able to distinguish a certain manner or style in his paper pictures similar to that which marked his daguerreotypes in the early years of the art. In the card pictures here there is considerable delicacy and fine feeling; the pictorial backgrounds and accessories have a slightly florid tendency without any approach to vulgarity; and there is always perfect keeping between the pictorial background and the other accessories employed, thus maintaining a completeness and harmony which many photographers would do well to consider and imitate. The pose and arrangement, generally, are marked by fine taste and variety of resource. M. Claudet also contributes some very charming portraits of children, and some frames of studies of heads, which consist chiefly of busts and heads cut from card pictures. A frame of studies of hands, arms, feet, and individual features of the face, cut from large pictures, is very interesting; such studies will frequently be of great value to the painter.

M. Joubert's contributions possess much variety in both style and excellence. Some of his portraits are as perfect as any in the exhibition, possessing wonderful force, brilliancy, and modelling. There is in a few of the pictures some tendency to hardness, but the majority are excellent illustrations of photography, and all are characterized by much artistic feeling. M. Joubert's scenic backgrounds are amongst the most effective we have ever seen. Altogether, M. Joubert's pictures are characterized by the qualities which his many years' experience as an engraver of high standing justify us in looking for in his work.

We have already spoken of the contributions of Mr. Williams, and of the wonderful uniformity of excellence they possess. In delicacy, roundness, brilliancy, modelling, they are perfect as specimens of portrait photography. It is, perhaps, in the vignette heads, whether card size or whole plates, that these qualities are most strikingly illustrated, although nothing could be better than his card pictures. Mr. Williams avoids pictorial backgrounds, obtaining variety and effect by the use of a plain background and the arrangement of curtain and ornate furniture.

Messrs. Hennah and Kent exhibit some good specimens of portraiture on albumenized paper, the special style, on plain paper, with which, at one time, their names were associated, being entirely absent from the present exhibition. It is worthy of remark that their albumenized prints possess much the same character of tone which used to distinguish their ammonia-nitrate plain paper prints. Their portraits of children are their most successful contributions. A picture of a grave-digger is somewhat stiff and stagey.

Messrs. Maull and Polyblank are very unequal in their contributions; some are very good; No. 12, a portrait of a lady is very fine; but many are hard and common-place, and some large pictures on a whole sheet of paper are vulgar and clumsy. The portrait of "The O'Donoghue" is, in every sense, poor; the position is awkward and conceited, and the photography unsatisfactory, the corners of the picture being not simply undefined, but beyond the circle of illumination given the lens.

Mr. W. E. Debenham exhibits some very perfect specimens, but with a little inequality. Some of his pictures are as nearly as possible perfect, but there is a slight tendency to excessive sharpness, and a disposition in securing brilliancy to trench on hardness.

Mr. H. P. Robinson exhibits some fine specimens of large portraiture on plates 15 by 12. In these he has attempted some daring contrasts, such as the use of a background nearly black, with a group in which a very dark and a very light dress appear. The result is effective, but perhaps slightly sombre. A similar picture with a single figure attracts much attention, and is generally regarded as a portrait of one of the royal princesses; we believe it is

simply an accidental resemblance and not a likeness. We have noticed a very grand photograph, a portrait of Mr. Robinson himself, before. We regret that he has not contributed any of his charming card pictures to the present exhibition.

Messrs. Ross and Thompson, of Edinburgh, contribute a number of portraits and portrait studies which, if it were not for a slight tendency to blackness and heaviness, which we have mentioned before, would be very perfect indeed. There is great variety and fine taste in their general arrangement. A series of portraits of children, entitled "Flowers from Fairy Land," are characterized by much that is charming; there is a general freshness and absence of the common-place about these pictures, and the same time freedom from strained or theatrical effect.

Mrs. Julia Margaret Cameron contributes a series of portrait studies which have a very distinctive character of their own. They are large busts on 10 by 8 plates; and if they had been paintings, would have been styled bold sketches rather than finished works. But as one of the especial charms of photography consists in its completeness, detail, and finish, we can scarcely commend works in which the aim appears to have been to avoid these qualities. The portraits are chiefly those of men of mark, as artists or authors, and include Mr. Holman Hunt, Mr. Henry Taylor, Mr. G. F. Watts, and some others, and both from the subjects and the mode of treatment, interest, whilst they fail to please us. The style is very similar to that of a series of portraits of painters, issued by Mr. Wynfield, an amateur photographer, himself a painter. We have often condemned excessive sharpness in a large head as a vice, but whilst we condemn excessive sharpness we desire to see modelling and form, and not the confused image from considerable moving of the sitter, and complete absence of definition, which we find in the portrait of the author of "Edwin the Fair," &c., in which we find an effect similar to that produced by a painter when he has hastily rubbed in the masses of his subject, without any attempt at detail. The force and sketchiness of the pictures will unquestionably interest, but whilst they exhibit power they fail in that which is the real strength and excellence of photography.

In the catalogue, we find the name of Mr. Annan associated with some portraits, which we fail to find in the exhibition. We regret this, as we have seen very charming portraits bearing this gentleman's imprint; a very excellent open air group of Scottish peasantry is the only example of his portraiture exhibited.

There are many other good examples of portraiture which do not call for very especial notice. Amongst these we may mention a frame by Mr. Hubbard which have good qualities, but lack repose; some fine portraits by Lucas Brothers, who also contribute some excellent pictures of horses; some pleasing portraits by Mr. Buchanan Smith; a frame with considerable variety of excellent portraiture, by Moira and Haigh; and good portrait photographs, by Wyat, Winser, Rolf, and some others.

There are also some excellent examples of portrait enlargement, by Mr. Alfred Harman, who enlarges the negative, and some effective enlargements by Mr. Sydney Smyth, who uses the solar camera.

PHOTOGRAPHIC CHEMICALS:

Their Manufacture, Adulteration, and Analysis.

Iron (*continued*). — Iron forms several compounds with oxygen, the most important being the protoxide, the magnetic oxide, and the sesquioxide. The protoxide is scarcely known in the separate state, as from its powerful affinity for oxygen it rapidly absorbs this element from the atmosphere, and even separates it from water when heated. Although in a free state it is so instable, protoxide of iron is a powerful base, and forms a well-defined and definite series of neutral salts, some of which will be described shortly. All the salts of the protoxide of iron have a great tendency to absorb oxygen and pass to the state of persalts. They will, in general, remove oxygen from the atmosphere, but with much greater readiness they take oxygen from the salts of any easily reduced metal with which they are mixed, as, for instance, silver or gold. It is owing to this fact that they are so much made use of in photography. The magnetic oxide of iron is by many persons regarded as a compound of the protoxide and the sesquioxide. Its composition is $Fe_3 O_4$, compounded of Fe O and $Fe_2 O_3$. It is very stable, and is readily formed by precipitating a mixture of proto and per-sulphate of iron with caustic soda and boiling the mixture for some time. It forms a velvet-black powder, which is magnetic even when in the liquid, so that the precipitate collects round a magnet dipped into the liquid in which it is suspended. When dried, it forms a brown-black, strongly magnetic mass. This oxide of iron is often found native, and within the last years has been met with in enormous quantities in different parts of the world. It is frequently used for the preparation of metallic iron. The magnetic oxide of iron dissolves in acids, but does not form a definite series of salts.

The sesquioxide of iron is the most stable of all the oxides. It is precipitated whenever an alkali is added to a solution of a sesquisalt of iron. In the hydrated state it forms a reddish brown powder, which can be washed and dried without change. It dissolves readily in acids, and forms a definite series of salts, which are, however, in general, not so easily crystallizable as the salts of the protoxide. The affinity of this oxide for acids is, moreover, much less than that of the protoxide, and it has a great tendency to form difficultly soluble basic salts. When some metals, such as iron or zinc, are added to salts of the sesquioxide of iron, or when they are mixed with sulphurous acid, they are converted to the proto condition. The reaction with metallic iron is very definite, and, symbolically expressed, will be intelligible to most of our readers.

$$Fe + Fe_2 O_3, 3SO_3 = 3 (Fe O, SO_3).$$

The same reducing action is effected by metallic silver at a boiling temperature; this is very remarkable, because, at ordinary temperatures, a protosalt of iron, in contact with a silver salt, is converted into a sesquisalt, silver being precipitated in the metallic state. This curious reaction may be readily observed by any of our readers. If some spent sulphate of iron developing solution be taken, with the finely divided silver suspended in it, and this be heated to the boiling point in a test tube, it will either become quite clear or a considerable quantity of the precipitated silver will dissolve. Upon now filtering the liquid, if necessary, there will be seen to form upon cooling a light grey precipitate, which will consist of metallic silver, dissolved by the persulphate of iron at the boiling point, and again reduced by the iron salt at the lower temperature. This is a remarkable instance of the dependence of an important chemical reaction upon the simple circumstance of temperature. It also shows how delicately poised are the operations of photography, and what apparently trivial circumstances are sufficient to neutralize or over-balance a reaction. Persalts of iron are reduced to the state of protosalts by many organic compounds; thus, according to Stenhouse, fresh grass, the green parts of trees and shrubs, hay, wood shavings, sawdust, peat, and coal effect the reduction at ordinary temperatures; whilst sugar, starch, gum, alcohol, turpentine, and shreds of paper effect the same at a boiling heat.

Sesquioxide of iron is found native, and constitutes one of the most valuable ores of iron. In the anhydrous state it is known as specular iron and red hæmatite, and in the hydrated state it is known as brown iron ore and brown hæmatite. The anhydrous forms of sesquioxide of iron are very difficultly soluble in acids, but the hydrated forms dissolve with greater readiness, especially when freshly precipitated.

The general characteristics of salts of the protoxide of iron are as follows:—They are, for the most part, white

when anhydrous, and pale greenish blue in the hydrated state. The soluble salts have, at first, a sweetish, and afterwards an inky taste. They give off their acid on ignition, if the acid is volatile. They absorb oxygen from the air and from various oxidized compounds, and are thereby converted into ferric salts. We have already given instances of this reaction. If no excess of acid is present to hold in solution the whole of the sesquioxide of iron which is obtained when, for instance, a silver salt is reduced by a protosalt of iron, part of the sesqnioxide is precipitated in the form of a yellowish brown basic salt. This is the reason why it has been found by experience advisable to have free acid present in iron developing solutions; almost any acid will answer the required purpose, except it be one which is itself capable of giving up oxygen to the protosalt of iron; thus it would be clearly inadmissible to use nitric or chlorie acid, unless the solutions were very weak. Acetic or sulphuric acids are the best for photographers to employ. When a powerful battery current is passed through a solution of a protosalt of iron, the metal is deposited on the negative pole in a very pure state. When a fixed alkali, such as soda, is added to a solution of sulphate of iron, it precipitates the white hydrated oxide, which rapidly darkens upon exposure to the atmosphere. Ammonia only yields a partial precipitate, some of the iron remaining dissolved in the liquid and gradually separating as a brown film on the surface. Phosphate of soda throws down a white phosphate of iron, and arseniate of soda a white arseniate of iron. Ferrocyanide of potassium forms a precipitate which is white, if the solution has been perfectly freed from air by boiling and the protosalt is perfectly free from any trace of persalt, but otherwise this precipitate is bluish white. Upon exposure to the air, or oxidation with nitric acid, this precipitate is converted into prussian blue. Ferricyanide of potassium gives a precipitate of prussian blue even in very dilute solutions. All those salts of protoxide of iron which are insoluble in water dissolve easily in hydrochloric acid. When tincture of gall is added to a pure solution of protosulphate of iron it neither colours nor precipitates it, but the mixture on standing acquires a violet black colour on exposure to the air. Oxalic acid and acid oxalates communicate a yellow colouration to sulphate of iron, and after a while throw down yellow oxalate of protoxide of iron; the precipitation being complete when an alkaline oxalate is used. When an oxalate is added to a persalt of iron, it is reduced upon exposure to the light, with precipitation of the same body as in the former case.

IRON NEGATIVES WITHOUT INTENSIFYING.

BY G. A. BEECROFT.

Having lately given some attention to the production of negatives by iron alone, without subsequent intensification, I take the liberty of stating the conditions which seem most favourable. By avoiding the process of intensifying, we gain several advantages; for example, a saving of time and silver, and that great and most necessary photographic requisite—patience. First and foremost, a *pure* silver bath is the mainstay of the whole process. Its perfection being secured, or at any rate an approach thereto, the subsequent steps will proceed satisfactorily. The best kind of nitrate seems to be the "trebly crystallized," which may usually be depended upon. In most instances, the bath made from it and simply saturated with iodide, will give charming negatives, without any further doctoring, either of the bath or pictures. Any good sample of collodion giving a rich creamy film will do: I have lately been using some commercial samples, and also some "home-brewed," after the Year-Book formula.

As to developer, the double sulphate of iron and ammonia seems to have some little advantage over the ordinary protosulphate, giving more density and very clean pictures, with remarkably clear shadows. I usually make a stock solution, 48 grains to the ounce, with about 30 minims of acetic and a little formic acid; no alcohol, unless the bath be old. This solution is frequently diluted to suit the difference of light, &c. If this be found to give too much density, a return may be made to our old friend FeO, SO_3, or a little positive collodion may be added to the samples in use, or even a little more bromide will often be a remedy.

Last, but by no means least, good manipulation, especially in developing, and correct exposure are half the battle.

Hypo seems preferable for fixing, since cyanide will cause blue stains, unless the iron be very well washed off.

For such of our amateur brethren as like to be their own workmen, I will append a description of my own manipulating room, which, thanks to Mr. Aldis, to whom I beg to express my sincere gratitude, is by no means *dark*. I twice painted over the whole window, consisting of nine large panes, with the pigment recommended in the pages of the Photographic News, by Mr. Aldis, with the exception of the central pane, to which I fitted a wooden shutter, to admit white light when needed. The result was charming: not a trace of fog, even with the sun full upon the window, and enough light to see to read small print, even on a dull day. Immediately under the window I placed a long, narrow, and rather high table, and on it a large gutta-percha dish, from which an india-rubber tube passed through the table down to a large tin pail beneath. On a small shelf, about five feet from the ground, I place a tin can, holding about three gallons, and from its spout I hang a long india-rubber tube, as a syphon, secured at the bottom by a spring clip. On compressing the clip, the water flows in a gentle stream, which can be readily directed to any part of the plate. The whole affair is neat, handy, and inexpensive.

For open-air portraiture I am rather badly off, having to work in a deep well between four high walls. To keep off top-light I use a curtain hung on two rods, and suspended by cords and pulleys from each side. A cloth background and a chair or two complete my "properties." By the way, in taking vignette heads, a very nice soft effect may be produced by shaking the background during exposure: this, of course, obliterates all creases, &c. My average exposure, with a Dallmeyer's No. 1 B ($4\frac{3}{4}$-inches back focus) and large stop, is between four and seven seconds.

If any amateur *confrère* should like to see my room and appurtenances, I should have pleasure in acting the showman any afternoon. I enclose a few cards taken under these conditions.

4, *Gloster Terrace, N.W.*

[The examples forwarded by Mr. Beecroft are in no wise deficient in intensity. It is probable that further intensifying would, in every instance, have injured the negatives.—Ed.]

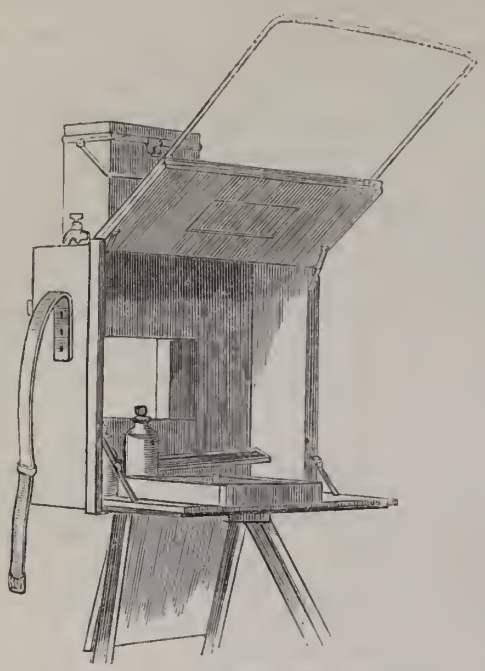
A MODIFIED DEVELOPING BOX.

BY VALENTINE BLANCHARD.

As the out-door photographer's campaign has, by this time, fairly commenced, it may not be out of place to describe some modifications in the dark box described by me some time ago in the News, and specially undertaken to give facility for the working with comfort on much larger plates than the large stereo size, viz., $7\frac{1}{2}$ by $4\frac{1}{2}$. At the outset, I now must repeat what I have frequently said, viz., that I think the dark box with sleeves is the very best kind of apparatus for the successful working of small pictures, for I have found, that by its use, I have been best able to ward off the attacks of that most bitter foe to all photographers, and the "Mar-all" of his otherwise finest results—I mean dust. I find, however, that for plates larger than $8\frac{1}{2}$ by $6\frac{1}{2}$, the dark box is compelled to be made so deep, that there is great difficulty in reaching with the arms through the sleeves to every part of the box, and I have therefore introduced a slight modification which does not interfere at all with the

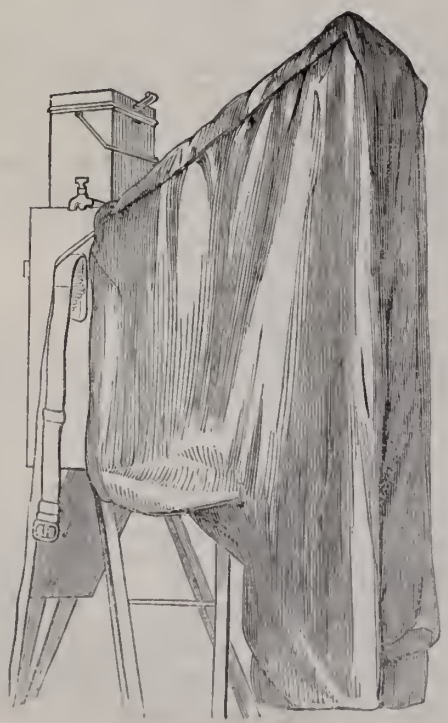
portability of the box, nor with its capacity to carry all that is requisite for a day's work in the shape of chemicals, plates. lenses, &c., but by which, when the apparatus is erected, all the requirements are met of those who work only on large plates, whilst, when packed, it is still as easily carried as a portmanteau.

Fig. 1.



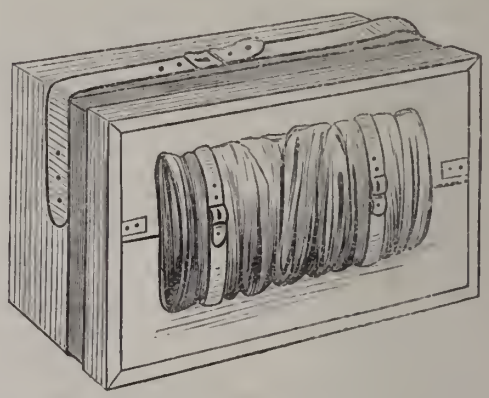
A reference to the woodcuts will at once show the points of peculiarity. Two doors open in the side of the box, as in

Fig. 2.



the old one with sleeves. The lower door, when down, forms, with the bottom of the box, the table, whilst the upper door turns up at an angle of about 45°, and on this is fixed a wire extension, which serves to keep the dark covering away from the shoulders of the operator, and leaves him free and unfettered for his work. All the chemicals needful for a day's work are stored in the tank, which, when in position on the top of the box, holds upwards of a gallon of water. The whole affair is very rapidly put up, for the doors are held in position by knuckle joints, which at once spring into their place. The covering, which, when not in use, is strapped on the side of the box *à la* knapsack, is readily placed over all, and is held in position by a tape run in the hem which draws tightly in a groove in the box, as

Fig. 3.



shown in the engraving of the apparatus when packed. By strapping the covering on the outside of the box, much additional room is gained for storing, and the apparatus, in consequence, need not be so bulky as those usually made. The above description will, I trust, be sufficient as the woodcuts will at once make clear any point at all doubtful.

JOTTINGS FOR JULY.

FROM THE MENTAL SKETCH-BOOK OF A PHOTOGRAPHER'S ASSISTANT.

IN days of yore, the soft breezes of July that fanned the smiling face of Nature afforded a glowing theme for poetic fancy; but in these degenerate days, Nature, with lowering brow and windy wailings seems to mourn o'er the dark deeds of blood that are being perpetrated on this our earth; for, whilst we write, John Bull's never-failing topic—the weather—is such as the most sanguine photographer would pronounce too bad for business. Black as the clouds that hover o'er the political horizon, and cold as the charity that permits poor creatures to starve in this luxurious Babylon, whilst ever and anon showers of rain descend as searching and irritating as the cry of injustice when it reaches the sympathising ear of genuine philanthrophy, the July of the present cannot claim kindredship with those of the past. But we are opening an uncongenial track, so will turn into another path.

The photographer's motto is progress, and those who have been privileged to witness the present photographic exhibition must admit that motto has not been disgraced. So little food have visitors found there for grumbling, that privilege of the true-born Englishman is constrained to seek a field for exercise in the realms of ought-to-be's. Luckily, those ought-to-be's did not put in an appearance, for the small, but well-filled, rooms contain pictures sufficient to cover every inch of its limited space, and among them enough of beauty to convince every unprejudiced mind that individuality may find expression even in a "mechanically-produced sun pic-

ture." If photography does not in that exhibition assert her right to be regarded as a legitimate sister of the fine arts, ye knowing ones expound to our benighted understanding the meaning of that exclusive mystery. Is it art to copy faithfully the glowing scenes from Nature, which, in soft silent moments emit in ever-glancing rays of beauty reflective images that float on golden beams of light? The luxuriant verdure of India's sultry clime, or the more chastened landscape of our own beloved land? Then we have it there with all your boasted laws of composition obeyed. Is it art to transcribe well the human face divine, with the touch of genius faithfully imparted, that brightens up the countenance, causing the eye to gleam with the fire of intelligence, and the lofty brow to bear evidence of its Creator—God? Then we have it there with flowing lines and balanced parts which challenge criticism—that glorious composition wrought by Robinson; the chaste productions of Bedford; the delicate portraiture of Williams, and many exquisite works from other hands that space forbids us to enumerate. Do they bear impress of mind? If these are simply mechanical, again we inquire, What is art? As our pen is now being guided to record thoughts emanating from the mind, so is the camera adjusted as suggested by the intelligence and artistic conceptions of the photographer. True, the power is not his to compose such marvellous groups as those proceeding from the untrammeled hands of acknowledged masters, because he lacks material. The painter exercises his skill on an inert body, until it visibly interprets the vast conceptions of his genius-lit mind. He may touch and retouch, and then declare all perfect; but the photographer, ere he can accomplish such a work, must convey and enable other minds to realize the visions that struggle for outward existence in his own. Is he less an artist because he fails to meet successfully this and other natural difficulties? Visit the Photographic Exhibition, and a reply to our question will there again be found. Other fields provide a freer scope. Glowing gems culled by skilful hands from Nature's whole; the silvery stream and running brook; the humble gleaners with their resting load of industry, that speaks of a providential care for the coming morrow; the thoughtful student surrounded by his well-filled book shelves that seem frowningly to remind him that a lengthened life is but a flash of time in the world of anxious ignorance. From the contents of that humble room at Pall Mall, we could find evidence in volumes silently defending the legitimate claims of photography. *Photographers are not all artists; but, be it remembered, painters are sometimes daubers.*

That interesting portion of the News humanely devoted to anxious inquirers, in last week's issue, contained replies from which we learn that the vicious plague of mealiness still continues to torment the followers of the black art. From the almost entire absence of complaints of late, we had hoped the disease had disappeared. That it has not, the complaining referred to doth clearly testify. Although the causes have again and again been explained, and remedies prescribed, there still remains to us one yet unpenned remark which may prove useful, if we here provide for it a place. The novice dram-drinker destroys the fiery spirit of his burning draught by adding pure water. We counsel that the eager haste for biting action displayed by toning solutions be curbed in like manner. The advantages of this weakening process have been fully recognized in nearly every branch of photography, and yet, strange to say, this controlling power has been overlooked in a direction where it is so much needed. In a large majority the toning formulæ are wrong in principle, because they produce solutions too concentrated. The prints first submitted to their action are quickly toned. Rapid toning means strong powers for bleaching, and this last is the parent of that vile offspring called mealiness; proof of this last tendered statement is produced in the fact, that a batch of prints toned in a solution weakened by exercise, proves more brilliant, vigorous, and free from imperfections than any batch that preceded it in the same solution. The formulæ we now use is two and a half gallons of water, to which is added seven grains of gold previously treated as described in former jottings; with this solution, toning proceeds slowly and evenly, without loss of time, for two, three, or four hundred card pictures may with ease be toned at one time. To insure the working of the solution, throw overboard the fallacious notions of "alkalinity indispensable."

And now a concluding word or two about blisters. Among the countless samples of paper that have passed through our hands, we have found but one yielding the singular result named, and that one prepared by the same maker described by a correspondent in the News. We have ever held aloof from praising or condemning publickly any man's goods, and moved by the same spirit, we refrain from tendering here our opinions respecting the blister-producing cause; suffice it to say, Rive paper, No. 49, does not always play such tricks; we have used a large quantity of it during the present summer, and its behaviour has been in every sense of the word excellent. Let the saddle be placed on the right horse. Blame not the paper. Hail! happy day, when a perfected carbon process shall banish printing difficulties for ever.

RESEARCHES ON POSITIVE PRINTING.*

BY MM. DAVANNE AND GIRARD.

Chapter VIII.

Treatment of Liquid Residues.

We shall, in the first place, occupy ourselves with the treatment of liquids: 90 per 100 of the silver employed is found dissolved in them, and it is upon them that our attention should first be fixed.

Many processes have been proposed for the treatment of liquid residues: none of which, in our opinion, completely respond to the programme we have traced above; therefore we reject them. A few words will explain our reasons for so doing.

The first process recommended was that by M. Davanne, in 1855. It consisted in mixing all the liquid residues together, and adding a solution of liver of sulphur, which precipitates the silver in the state of sulphide, to collect this latter, and carefully roast it, so as to burn out all the sulphur, and then melt the residue with its weight of nitre.

This process fixed the attention of operators from the first; many adopted it, and more than one re-discovered it, subsequent to its first publication. It is now practised in some laboratories, but its adoption is far from general. In fact, it presents many objections; the alkaline sulphides give out hydrosulphuric emanations in the operating room, which are not only offensive and disagreeable, but also injurious to the stability of the proofs prepared in it. A large quantity of sulphur is precipitated with the sulphide of silver, which renders the subsequent operation of roasting delicate and unpleasant. If the roasting is incomplete, the mass retains a certain quantity of free sulphur, which, in presence of traces of carbon, which the ashes always contain, and of the nitre with which they are treated, may give rise to dangerous explosions.

If, to avoid these inconveniences, we substitute for the liver of sulphur the mono-sulphides found in commerce among chemical products, we encounter the other inconvenience of operating with uncertain products, often richer in carbonate than in sulphide, and at other times containing an excess of sulphide. Still, with a certain amount of skill, it is easy to overcome these inconveniences, and the sulphide process would still be recommended, if chemistry did not offer, as we shall show, much simpler methods.

Since its first publication, M. Maxwell Lyte has made known two consistent processes; the first is to boil the residues with a solution of potassa; the second, to treat them

* Continued from page 319.

by boiling with a mixture of glucose and potassa. It is, we believe, useless to insist on these two processes; to advise our photographers, many of whom produce some scores of gallons of residues every day, to undertake the boiling of them; it would be to advise a manufacturing operation, to which it is evident few or none would submit.

We do not dwell upon the more consistent process of treating the residues by acids, with the view of decomposing the hyposulphite of soda; it is not practicable, and can only be adopted in the analytical operations of the laboratory.

M. Peligot, of the institute, was the first to enter upon a new and excellent method. The process which in 1861 he presented to his colleagues of the French Photographic Society, consists in immersing a plate of zinc in the residues, upon which the silver is precipitated in the state of metallic powder which is afterwards melted with a little borax and salts of soda. This process succeeds very well with the washings, which contain only nitrate of silver, but presents a serious inconvenience when we operate upon solutions of hyposulphite of soda. A considerable quantity of sulphide of zinc formed by the action of nascent hydrogen is deposited at the same time as the metallic silver. The presence of this sulphide of zinc, renders the fusion of the silver very difficult. We can, it is true, remove the difficulty by treating, as recommended by M. Peligot, the precipitate with a small quantity of dilute sulphuric acid; but in this case, the sulphuretted hydrogen formed reacts upon the silver in powder, one part in sulphide, and the metallic button obtained by fusion does not correspond to the quantity of silver the residue contained. Fortunately, it is easy to obviate this inconvenience, by slightly modifying M. Peligot's method, and substituting copper for zinc, upon which the silver is also deposited readily, and which behaving in presence of hyposulphite like the silver itself, does not occasion the formation of sulphide.

It is therefore M. Peligot's method, modified by the substitution of copper for zinc, that we recommend to photographers.

But before entering upon the practical description of the operation, it will not be without interest, if only to avoid useless researches, to relate in few words the numerous attempts that have been made to separate silver from hyposulphite solutions.

Before adopting copper for precipitating, we have tried several other metals, iron, tin, &c.: we have also tried various pairs of metals; in almost every instance we have seen the silver precipitate, but always remaining mixed with greater or lesser proportions of sulphur compounds.

A weak electric current easily decomposes argentiferous hyposulphite solutions, but the precipitate obtained thus is formed of sulphide of silver, and not of metallic silver.

The process employed by M. Martin for silvering glass we also tried; in treating the residues with inverted sugar and ammonia the silver is deposited, but so slowly, that photographers cannot take any advantage of this interesting reaction.

From another point of view, MM. Millon and Commaille have recently proposed to treat photographic residues with ammoniacal protochloride of copper. This process is good in principle, but not practical: for the protochloride of copper is a very costly article, exceedingly unstable, and its greater or lesser degree of alteration cannot fail to lead photographers to commit serious mistakes.

Taking the same point of view, we have submitted the residues to the action of ammoniacal protosulphate of iron. This process, in consequence of the relative stability of the protosulphate of iron, presents decided advantages over the preceding. By treating the residues with a quantity of this salt, equal to two and a half drachms for every drachm of silver they contain, and adding a few drachms of ammonia, a precipitate is formed of metallic silver and peroxide of iron, mixed in nearly equal proportions. Unfortunately, this precipitate always contains five or six-hundredths of sulphur, which, when the dried mixture is fused with the usual fluxes, even with the addition of nitre, renders the operation very difficult, so much so as to induce us to abandon the process.

Lastly, we may mention the experiments we have made with the view of destroying the hyposulphite of the residues in oxidizing it by means of the hypochlorites, converting it into sulphate, and so precipitating the whole of the silver in the state of chloride. By operating on this principle with concentrated chlorides of soda or potassa, we have obtained the most satisfactory results; still we do not recommend this process, for it is more complicated and expensive than that based upon the employment of plates of copper, of which we now proceed to give a description.

A plate of copper, left in the solution of nitrate of silver which constitutes the washings, precipitates the whole of the silver in the state of metallic sponge in four and twenty hours. A plate of zinc acts in the same manner.

A plate of copper, left in the solution of hyposulphite of soda, which constitutes the fixing bath, precipitates the silver in the form of a coherent powder, often, even, in a continuous plate, but with less rapidity; two days' contact are necessary, at least, and four days are better, but at the end of this time the action may be considered as terminated; prolonging it will be neither injurious nor advantageous. If the precipitate be longer in presence of the hyposulphite, it is not, moreover, so complete. About one-tenth of the silver remains in solution, but this loss may be neglected; it is very trifling, in fact, for the quantity of silver contained in the hyposulphite does not exceed 37 per cent. of the total quantity, which reduces the loss to 3·7 per cent. of this quantity.

We perceive, then, from every point of view, that there is an advantage in treating separately the washing waters before toning, and the fixing solution.

To this end the photographer must have, either within or without the operating room, two earthen vessels of such dimensions that one may contain the washing waters of two days, the other, the fixing solutions and their first washing waters of four or six days. In each of these pots a number of plates of copper are placed; or two large plates placed opposite to each other answer very well. No suspension or particular precaution is necessary, the sheets of copper may simply rest against the sides of the vessel.

In the course of his working, the photographer will throw the washings into the first pot, and allow them to remain twenty-four to forty-eight hours as required. Into the second pot he will throw the fixing baths and the first washings, taking care to leave them for at least a couple of days to settle.

In both vessels he will see metallic silver deposited upon the immersed portions of the plates of copper, which he will take care to remove from time to time with a hard brush. The silver powder may either be collected immediately or left at the bottom of the vessel until it has accumulated in sufficient quantity to be melted. In either case, the liquid must not be decanted until some minutes after brushing the plates, and when the silver powder shall have had time to be precipitated.

The powder will be afterwards collected upon a paper or linen filter, if the quantity is considerable, then dried in the open air or in a stove or oven.

It will now be ready for melting. This is an easy operation under present conditions, and the photographer can perform it himself; but if he prefers to avoid it, he can sell the metal precipitate to a refiner. The form under which the silver is precipitated is preferable to any other for this purpose, for it is quite easy to put this powder into the crucible and ascertain its value before the purchase is effected. By taking the precaution to assay the product before making a sale, all disputes are avoided. But if the photographer prefers to fuse the powder himself, he will proceed as follows:—He will place a good crucible in the furnace and make it red hot, and when this temperature is attained, he will throw in, little by little, the following mixture:—

Silver powder, washed and dried...	100	parts
Fused borax, pulverized	50	„
Fused nitre, pulverized	25	„

The object of the nitre is to oxidise most of the copper mixed mechanically with the silver while brushing the plates. When all ebullition has ceased in the crucible (the height of which must be such that it will contain at least three times the quantity of mixture put into it), the fire must be increased during twenty minutes, then left to cool, when the crucible must be broken to remove the metallic button. This will still contain a little copper, but that will be the only impurity with which it will be mixed. The photographer will encounter no further difficulty, either in converting it directly into nitrate, or in selling it to a refiner after being tested.

(To be concluded in our next.)

NEGATIVES UPON COLLODION AND GELATINE.

BY CAMILLE FABRE.

Into a vessel filled with soft water, put some gelatine cut into pieces of this size; ▭ in the course of ten or twelve hours it will have absorbed sufficient water. Then stir the water with a pencil to wash off any impurities, and withdraw the gelatine.

The gelatine will be found swelled but not dissolved, and it contains sufficient water for the following operation; take a small earthen pot, and putting the gelatine into it, place it over a gentle fire; the gelatine soon melts, and becomes sufficiently fluid to be poured over the negative.

Place the negative, picture upwards, upon a plane surface, at an angle of about 25°. Then take a soft pencil, dip it into the gelatine moderately warmed, and spread it over the plate, beginning at the top, and avoiding air-bubbles, which, however, if found, may be made to disappear upon slight pressure; this done, we have a coating of gelatine upon the negative, which of itself, when dry, forms a good varnish for printing positives. This first coating of gelatine is put to dry on a level surface, then a second, and other coatings to the number of five are made, to obtain a smooth uniform surface; for the first coating it is important not to touch the collodion with the pencil, so as to retain the integrity of the picture. In the succeeding coatings the operation becomes easier, and the solution of gelatine spreads readily. It is of course understood that each coating of gelatine must be quite dry before the next is applied.

The next thing is to remove the negative thus treated from the glass plate.

To do that, it is necessary to give the plate a gentle warming, by holding it over boiling water, picture upwards, or better still, with small negatives, by the heat of the human body. Place the negative beneath the waistcoat, the glass in contact with the shirt; in a few moments afterwards withdraw it, and by means of a knife, cut the collodion and gelatine round the edges, and the picture detaches itself spontaneously.

For the developer, I employ protosulphate of iron, prepared in the ordinary manner, to which I add ten or twenty drops of a solution of nitrate of uranium, 20 per cent. to a bath containing a pint of developing solution.

The developer thus modified yields metallized negatives, and I have remarked that this addition of nitrate of uranium to the developer greatly facilitates the removal of the negative from the plate.

This process will be found very useful to travelling photographers, as it reduces the quantity of glass plates necessary to be carried to a minimum.

Direct Photographs upon Gelatine and Collodion.—The solution of gelatine is prepared as above.

When the picture is obtained upon the collodion by the usual method, two coatings of gelatine are poured over the pictures, and with moist water-colour pigments, apply the appropriate colours with a camel's hair pencil, after the gelatine is quite dry. Then cover the design with several other coatings of gelatine, as in the negative process; the picture is removed from the plate in the same manner as the negatives.—*Le Moniteur de la Photographie.*

CHROMO-PHOTOGRAPHY AND POSITIVE PRINTING WITHOUT THE SALTS OF SILVER.

BEING SHORT LESSON IN PHOTOGRAPHY.—No. 25.

The salts of silver are not the only ones by which photographic impressions can be obtained; others have been found to be almost equally sensitive to light; and, in process of time and of chemical and physical developments, it is to be hoped that methods of photographic printing may be discovered which will supersede our present expensive system with silver and gold.

Notwithstanding the satisfactory eminence to which the art of photography has arrived, it must still be confessed that the science is in its infancy; for many phenomena remain without any rational or logical explanation. There is hence room for great development; from which we are justified in entertaining ardent hopes for the future of this splendid science.

All along we are pursuing a beaten track paved with silver and illumined with the noonday sun, as if no other road were passable and no other time expedient. We know that light decomposes the silver solutions; the facts and results of this decomposition are entirely within our control, and thus we dare not venture to experiment with other principles and other bases, lest we lose a reality for a shadow.

But there are other forces besides light that institute chemical decomposition; and, in fact, if heat and electricity be absolutely different physical agents from light, we know that they are instrumental in effecting composition and decomposition in chemical materials more easily and more frequently than the acknowledged photographic physical agent. We may, therefore, eventually hope to obtain calorific and electrical types with perhaps a greater facility than those at present obtained by the actinic agency.

The thermal state of the atmosphere is certainly implicated in photographic results; otherwise how shall we account for the difference of effects between those obtained in summer and winter, as also between those at seven o'clock in the morning and at mid-day? In these very differences, too, vapour is another agent in the play; hence, how shall we account for those existing between seven in the morning and five in the evening, at times when the sun has the same altitude? for at the morning hour in March or April the actinic property of light is very energetic, whilst in the evening it is considerably enfeebled. But at the morning hour alluded to, the atmosphere is comparatively free from moisture; in the evening, on the contrary, it is loaded with the vapours generated during the day. A clear and pure atmosphere is diathermanous; it absorbs but very little of the calorific rays of the sunbeam; on the other hand, vapours abstract from light, as it passes through them, most of its thermal intensity. Hence it seems to be a warranted inference, that that which has been thus abstracted from light, in its passage through a moist atmosphere, is the cause of the enfeebled actinic energy.

Furthermore, thermal changes produce corresponding electrical disturbances.

These, it is true, are mere hints or suggestions; but they present themselves with such force and probability that we cannot help regarding them as guide-posts of great significance; but they are leading us far away from the subject of the lesson.

Sir John Herschel discovered, several years ago, that the persalts of iron in connection with organic matter are sensitive to the action of light, being thereby reduced to the condition of protosalts, which are acted upon by a solution of ferrid-cyanide of potassium. This reagent produces an intense blue colour with the protosalts of iron, whilst with the sesquisalts it has no action.

This property of the persalts of iron has been carefully studied by many scientific explorers, in order to devise methods of positive printing without the salts of silver.

* From *Humphrey's Journal.*

Dr. Phipson was the first, I believe, to recommend the use of the oxalate of the peroxide of iron in this department of photographic printing. In his process the papers are floated in a solution of the oxalate of the peroxide, afterwards dried in the dark-room, and then exposed beneath a negative. By this means those parts upon which light acts become reduced to the state of the insoluble protoxide, the intermediate parts or middle tones are less insoluble, whilst those parts situated beneath the dark portions of the negative, not having been impressed by the actinic energy, remain soluble and are freed by washing from all adhering undecomposed oxalate of the peroxide of iron.

The image at this stage is faint and of a pale yellow colour. By immersion in a solution of permanganate of potassa, and afterwards in pyrogallic acid, the picture is thoroughly developed, and is then fixed by giving it a thorough washing.

Process for the Production of Blue Prints.

By the processes originally proposed to produce blue prints, whether by the use of the sesquichloride of iron, the oxalate of the sesquioxide, or the double oxalate of iron and ammonia, and by development with a solution of ferrid-cyanide of potassium, the lights of the picture were invariably tinged more or less with blue. This tinge of blue was attributed, by Carey Lea, Esq., one of the scientific correspondents to the *Philadelphia Photographer*, to the undecomposed peroxide, whereby Prussian blue resulted on immersing in the ferrid-cyanide, whereas the picture itself was formed of the decomposed protoxide into Turnbull's blue. The ingenious chemist, knowing that the former blue is soluble in oxalic acid, whilst the latter is insoluble in this menstruum, has succeeded finally in producing blue pictures in which the whites are perfect. His method is as follows :—

Preparation of the Double Oxalate of the Peroxide of Iron and Ammonia.

First make a solution of the double oxalate of the peroxide of iron and ammonia. For this purpose we require pure hydrated peroxide of iron, which may be prepared thus :—Dissolve iron filings or tacks in dilute hydrochloric acid to saturation; decant and boil the clear solution, with an addition of nitric acid from time to time, as long as fumes of peroxide of nitrogen are liberated; finally, continue the boiling in order to remove all free nitric acid. By this process the protoxide of iron in the solution has been converted into the peroxide, which is now precipitated by means of dilute ammonia. As soon as all the peroxide has been thus liberated and has subsided, the supernatant solution of chloride of ammonium is decanted, evaporated to dryness, and preserved for use.

The precipitate is now washed in much water, and then thrown upon a filter, and thus again washed by repeated additions of water. Finally, the precipitate is washed with water acidulated with nitric acid, and afterwards with pure rain water. The wet mass of red matter is hydrated peroxide of iron. To a hot solution of binoxalate of ammonia, add of the hydrated peroxide of iron as long as it is dissolved; finally evaporate the solution and crystallize. The substance or crystals thus obtained is the double salt in question, which has to be made and kept in a dark room.

Sensitizing the Papers.

Dissolve one ounce of the double salt in five ounces of rain water, and filter for use in the dark chamber. Float unsalted photographic paper in this solution for a minute or so, then hang it up to dry.

The papers thus sensitized have a pale yellow colour; they may be preserved for an indefinite time when secluded from light.

Exposing the Papers.

This operation is quite simple, and in every respect the same as that which takes place in the common silver printing process. The sensitized surface of the paper is placed upon the collodion surface of the negative plate in the printing frame, and is then exposed either to the direct rays of the sun or to diffused light. In the former case three or four minutes will be sufficient. The effect of the light is to produce a faint negative of the paper; for where the actinic rays have acted they have bleached the yellow rust. This will be the utmost visible effect.

Developing the Picture.

The papers, after exposure, decompose by keeping, so that the developing operation is most effective when performed immediately after they have been removed from the printing frames.

Formula for Developing Solution (Mr. Carey Lea's).

Ferrid-cyanide of potassium... ...	20 grains
Oxalic acid	20 ,,
Water	12 to 15 ounces.

Immerse the prints in this solution for two or three minutes. The picture appears with as great rapidity as in the collodion process with solution of sulphate of iron; it is of a blue colour. No further fixing is required than that of washing in water for about ten minutes. Too much washing is injurious.

A similar result is obtained by Professor Schwartz, of Breslau, in the following manner. There is a disadvantage in Schwartz's process, which arises from the circumstance that the sensitized paper is placed upon the negative in a moist condition.

Schwartz's Sensitizing Solution.

Sesqui-chloride of iron, neutral and crystallized	58 grains
Oxalate of ammonia, crystallized ...	53 ,,
Ferrid-cyanide of potassium... ...	54 ,,
Water	1 pint.

This solution is prepared in the dark; it has a greenish-brown colour. After the papers have been floated on this solution they are partially dried, and then exposed under a negative. The picture is brought out by this exposure; it is of a deep blue colour, and is fixed by simple washing.

(*To be continued.*)

DRY COLLODION PROCESS—ALMOST INSTANTANEOUS.

BY DR. JOSE FERNANDEZ CELIS.*

TAKE a plate prepared by Major Russell's process, and expose it before the object for two seconds in a good light, making use of a one-fourth lens stopped down to two-fifths of an inch; after which it is removed from the plateholder. Now varnish the four edges, and, when dry, moisten the surface equally, and proceed to the development of the image by means of pyrogallic acid, citric acid, and a few drops of nitrate of silver, until it appears in perfect detail; then fix it with hyposulphite of soda.

Wash the plate, in order to remove every trace of this salt, and pour immediately upon the film, so as to cover it equally and simultaneously, an alcoholic solution of iodine 6 per cent. strong, mixed with an equal volume of water; return the solution to the test-glass, and expose the plate to the rays of the sun for fifteen or twenty seconds, or more, since a longer exposure is not prejudicial. Again wash the plate until the oily aspect produced by the tincture has disappeared. The next step consists in strengthening the intensity by the ordinary pyrogallic developer in diffused light.

In order to promote the operation, it is very advantageous to expose the plate from time to time to the rays of the sun, and if it fail to assume the proper intensity, to flow it again with the iodine solution, and with the same precautions as before.

As soon as the proper depth of intensity has been attained, the negative is again fixed in a solution of hyposulphite of soda 15 per cent. strong, which lowers the intensity, and renders the negative very transparent. Should it be necessary to re-intensify, wash off the hyposulphite and flow the plate once more with pyrogallic acid and silver; finally, wash it, put it aside to dry, and then coat it with varnish.

The phenomenon produced by the tincture of iodine is wonderful, the negative assuming the appearance of a very beautiful silver positive. This disappears in proportion as the pyrogallic acid begins to operate.

If it were not for the action of iodine, which, in my opinion, gives rise to a new film of iodide of silver, it would

* *El Propagador de la Fotografia.*

be impossible to obtain anything, by a continuous redevelopment, more than a harsh negative devoid of detail; but by this solution it is otherwise, and the picture is free from all fogginess.

I have applied this process to wet collodion with the view of obtaining pictures with a very short exposure, but the results have not been equal to my expectations.

Especial care must be taken that the tincture of iodine be poured upon the collodion film equally and simultaneously. In my first attempts I could not manage this until I added water in the proportion indicated.

For such of the readers of *El Eco* who may desire to know the formulas I employ, I place them below, although they are identical with those already published in practical treatises on photography.

Collodion.

Pyroxyline	90	grains
Alcohol of 40°	6½	ounces
Ether	6½	„
Iodide of cadmium	30	grains
Iodide of ammonium... ...	30	„
Bromide of cadmium... ...	30	„

Silver Bath.

Distilled water	25	ounces
Nitrate of silver	14	drachms
Iodide of potassium	2	grains
Acetic acid	8 to 12	drops.

Preservative.

Distilled water	12½	ounces
Tannin ...	from 2½ to 3	drachms.

(To be filtered when dissolved.)

Solution of Iodine.

Alcohol	2½	ounces.
Iodine	9	grains.

[The Editor of *Humphrey's Journal*, whose translation we quote, says:—"The Photographic Society at Cadiz give credit to Dr. Jose Fernandez for having made a great discovery in the application of tincture of iodine as a means of redeveloping a weak negative. Having lived in Cuba, the learned Doctor must have known that this process is not new, in America at least, where it is used as one of the most common modes of intensifying. We need scarcely add that it is an authenticated and frequently adopted process also in Europe, both for the wet and dry processes. We employed it at least five years ago in the preparation of *instantaneous* —not two seconds' exposure—pictures by the wet process, by which we succeeded in photographing foliage during a violent wind, as also the jets of water from a watering can in the hands of the gardener.

"The Doctor, it appears, has not succeeded with Sutton's alkaline toning process—the more the pity—especially as he uses a diaphragm of two-fifths of an inch in diameter, and an exposure of two seconds; we feel convinced that with a good tannin plate, a first-rate lens, and so large an opening as above-mentioned, he will succeed in obtaining *truly instantaneous* pictures by means of the alkaline developer, followed up with his newly-discovered intensifier. The only novelty in this new intensifier (and we are willing to give him credit for it) is the exposure of the film to sunlight, after flowing the plate with tincture of iodine and water, and was first proposed, we believe, by Messrs. Barreswil and Davanne several years ago, and is analogous also to the discovery of Blanquart Evrard."

The use of the tincture of iodine, and the exposure of the plate to light, are very old in this country, and we have repeatedly described both methods. A solution of iodine 1 grain, iodide of potassium 2 grains, in water, 1 ounce, is more convenient than the alcoholic tincture.—Ed. Photographic News.]

TREATMENT OF PHOTOGRAPHIC PAPER.*

ENAMEL PAPER, CALLED ALSO ALABASTER OR PORCELAIN PAPER.

The desire of producing, for cartes de visite, brooches, medallions, &c., a brilliant surface which does not exhibit the grain of the paper, and which thus presents itself absolutely free from all the defects attributed to other important papers, has induced manufacturers to supply this paper for commerce.

Silver Bath.—The paper is floated four or five minutes on a nitrate bath, strength one to six, a little acid, then dried slowly in the heat of a room. Care must be taken to suspend it, not by one corner, but by its whole breadth, by two parallel rods, by means of wooden or glass clips, to prevent its rolling up, which would cause it to become brittle. The paper being dry, it is exposed, and when the shades are bronzed, it is washed several times, and a little acetate of soda added to the last water.

Toning Bath.—The following will do for six sheets of paper:—

Chloride of gold	1	part
Bicarbonate of soda	10	parts
Distilled water	2000	„

In winter, the toning bath must be warmed to 110° Fah. Add to the toning bath either 15 grains of citric acid, or 300 of acetate of soda, or 450 of phosphate of soda, which will permit the tone of the proof being varied according to the pleasure of the operator.

Fixing Bath.—This is formed of—

Hyposulphite of soda	1	part
Carbonate of soda	1½	„
Distilled water	16	parts.

The pictures produced on enamelled paper surpass in beauty all those we can obtain with other photographic papers; they exhibit such sharpness in the minutest details, a clearness and beauty of tone, together with a brilliant lustre, that we cannot imagine anything better for delicate proofs.

CASEINE AND ALBUMEN MAT PAPER (AMORPHOUS).

I. *Silver Bath.*—Nitrate of silver 1 part, distilled water 6 parts, acidulated with some drops of a solution of citric acid, strength 1 : 10.

II. *Gold Bath.*—Chloride of gold 1 part, or *sel d'or*, 2 parts, distilled water 1,000 to 1,200 parts, some drops of a solution of bicarbonate of potassa are added until an alkaline reaction begins to show itself (too strong alkalinity attacks the sensitive film).

III. *Fixing.*—

Hyposulphite of soda	1	part
Carbonate of soda	¼	„
Distilled water	5	parts.

The manipulation is not more difficult and requires no other precautions than those indicated for albumen paper. In all cases, avoid drying the nitrated papers by the fire, and dust, which would adhere to the surface and injure the sensibility and purity of the picture.

(To be continued.)

Talk in the Studio.

Copyright Bill.—The Select Committee on this Bill have reported to the House of Commons that, considering the difficulty and complication of the inquiry, they are not prepared to recommend any amendment or consolidation of the law of copyright without information, which, at this advanced period of the session, it is hardly practicable to acquire. They recommend that the whole question be referred to a Select Committee next session.

Carbon Prints in Polychrome.—We referred, in a recent article, to the possibility of obtaining carbon prints in two or more colours. Our esteemed contributor, Mr. H. Cooper, has, in the course of some experiments, produced some very fine pictures in this way. Various results have been obtained, the

* Continued from page 332.

cameo-like effects being most pleasing. We hope to publish in our next Mr. Cooper's detailed operations.

UNITED ASSOCIATION OF PHOTOGRAPHY.—From an advertisement in our pages it will be seen that a gigantic photographic company is in course of formation with this title. With its aspects as a great commercial undertaking, we have, in these columns, no concern: but as a scheme for the application of very large capital to the purposes of photography, under the direction of some of the most skilled photographers, as may be seen from a glance at the list of directors, and thus promising the advancement of the art, it will doubtless interest our readers.

SOUTH LONDON OPEN-AIR MEETINGS.—The field meetings of the South London Society opened very auspiciously on Saturday last. Through the introduction of their President, the Rev. F. F. Statham, M.A., Beckenham Place, the residence of R. H. Page, Esq., with its fine park scenery, lake, gardens, &c., was opened to the members, of whom not more than a dozen, we regret to say, assembled. There was not much photography done, although dry processes and the wet process were both represented, and some good negatives, lacking only sunshine, were obtained. After photographing and rambling about the grounds, rowing on the lake, &c., the members were handsomely and hospitably entertained in the noble dining room of the fine old house, by Mr. Page, and thus concluded a delightfully spent holiday.

To Correspondents.

J. H. S.—We are glad you find the blue blind successful. 2. The best colour for a background is grey, because you can estimate its photographic value better than with browns or positive colours. It is very difficult, without showing an example, which, of course, we cannot do here, to indicate the exact depth which is desirable; but we may state, in general terms, that a background should be dark enough to contrast with the lights and lighter shadows, and light enough to contrast with the darkest shadows. An old man, with a bald or grey head, must have a background sufficiently dark for the head to be well relieved against it; but, if it be too dark, the head will cut too sharp against the background, and give a hard effect.

CALCIUM.—A swing back to a camera is of great importance in taking architectural subjects, and is sometimes useful in other cases; but it is only for architecture that it is imperative. 2. We have not used the wax coating ourselves, but from some who have, we learn that it is of great service with doubtfully-cleaned plates. Whether it will prevent the film leaving the plate in dry processes or not, can only be certainly determined by trial; we think it is doubtful. 3. We have noticed rings caused by irregular drying. If the plates are not kept at one temperature whilst drying, this most commonly happens. Rapid drying by artificial heat will often prevent this. 4. So far as we remember, the tone of your print was good.

A. GRENET.—No. 1 will, probably, give the most uniform definition and flattest field, and No. 2 will work most rapidly. The prices of the back volumes of the PHOTOGRAPHIC NEWS are as follows:—Vols. 1 and 2, 8s. 6d. each; vols. 3 and 4, 10s. 6d. each; vols. 5, 6, and 7, 15s. each. Vols. 1, 2, 3, 4, and 6 are out of print; but we occasionally meet with copies.

OBERON.—Lady Hawarden's "Life Studies" are not published, or for sale. 2. Yes, some of them; we do not know whether all are. 3. Good portraits can be taken with triple lens, when the light is good; the full aperture should generally be used. 4. We cannot state the average price of photographic prints, as so much depends on the subject and the artist's name. 6. The same is true of negatives. 7. We cannot repeat the article describing the preservative process here; it was published in our sixth volume, and the YEAR-BOOK for 1863. It is a very excellent one.

M. A.—Much depends upon the kind of work to be copied, as to the form; everything on the size of the picture to be produced, as to the size; and on the lens employed, as to the length to which it will extend. On p. 233 of the PHOTOGRAPHIC NEWS, vol. 2, a useful description, with dimensions, is given. Generally, we prefer a square shape, with bellow's body. 2. The triple lens is decidedly best for copying. 3. With a triple of sufficiently long focus you can copy 14 by 10 full size.

BRIGHTON DABBLER.—You do not give us sufficient data for the calculation. To determine the relative exposure required with different lenses, it is necessary to know the equivalent focus of each, as well as the aperture used. You can very easily determine for yourself, however, by one or two experiments, if you have the lenses. 2. There are no especial taxes imposed on professional photographers.

H. T. JAMES.—You will find formulæ for several lime-toning baths, with details of manipulation in our YEAR-BOOK. We have also published such formulæ in several recent numbers. One of the simplest consists in adding from a grain to a grain and a half of chloride of lime to one grain of chloride of gold in six ounces of water, and using in three or four days.

SOL.—Neutralize your bath by adding a few drops of a ten-grain solution of carbonate of soda to it, and then stand it for a few hours in strong sunlight. Then filter, and try; if necessary, add a drop or two of nitric acid to make it work clearly. 2. We do not clearly understand from your diagram how much side light you have. If, as it appears, that, beside the top light, you have only two small windows for side light, we should say you have too little.

IPROSFIC.—We believe that you will find all kinds of photographic goods dearer, at present, in the United States than in this country; but you will risk payment of duty in taking a stock over. How far goods for your personal use may be charged, we cannot state. Our experience of American Custom House officers is favourable. We have found them courteous and forbearing.

NEMO.—We prefer No. 2 in your list. Letters to secure a certain answer in the same week should reach us not later than the Wednesday previous to publication.

A CONSTANT READER.—For new plates there is nothing better than alcohol, and tripoli or rotten stone; and for plates which have been used the same, preceded by dilute nitric acid.

JOSEPH BERINGER.—We deplore the prostitution of our beautiful art to such purposes, and, probably, may have something to say on the subject. The danger of noticing such things at all is, that it rids in giving publicity to the matter.

TYRO.—It is desirable at all times to expose the plate as soon after it is excited as possible, but the elapse of a few minutes should not produce any injurious results. 2. Your negative is somewhat under-exposed, and, probably, a little over-intensified. 3. If a plate be left too long in the nitrate bath, it will, probably, become fogged. 4. You may use soft water for developer, &c. 5. If you make a 30-grain nitrate bath, it will not necessarily become weaker by using, as you abstract a certain quantity of water at the same time that you abstract silver, and a certain amount of water is also lost by evaporation. Nevertheless, the bath frequently does lose silver in greater proportion than water, and becomes weaker. In such case it is better to strengthen the bath by adding a portion of a stronger solution, than by adding crystals. 6. The ordinary chloride of lime of the oil shops is the article to be used in the toning bath.

J. S. W.—The silver can be precipitated from old hypo solutions as a sulphide, by adding sulphide of potassium. You will find full information on the subject in our YEAR-BOOK, as also on the other subjects you mention.

C. S.—The universal pink effect throughout the body of the paper, produced by your gold bath, is a result which sometimes happens if the toning be done in daylight. The sample of paper might also have something to do with it.

EXCELSIOR.—It is probable that the partition in your camera does not come sufficiently close up to the plate to prevent the two images overlapping. 2. You appear to have excess of chloride of lime. Add a little more gold to the bath. The negative does not appear to be a good one, and good tones can never be obtained with a bad negative.

JAMES DALE.—About 3¼ inches apart is the best distance for the lenses of a bilens camera. 2. The PHOTOGRAPHIC YEAR-BOOK is published at our office, price 1s. *Humphrey's Journal* is published in New York.

J. S. P.—We do not quite understand whether the portions of the room which you describe as "open to light" are glazed already, or may be glazed. So far as we can judge from the diagram, the background had better be placed at the end, C E; the roof from D B to A should be glazed, and the side, A to B, should also be glazed. Both ends should be opaque.

G. U.—Fig. 9 in the article is the last diagram; figs. 7 and 8 are placed together just above it; and 5 and 6 are on the preceding page, in due order.

W. W. B.—1 grain of iodine, 2 grains of iodide of potassium in 1 ounce of water, float the plate with the solution, wash, and then apply pyro and silver. Writing ink is altogether unfit for retouching photographs.

NIL DESPERANDUM.—We fear that your chief difficulty will be excess of light. It is probable, that to gain the best result you will generally have to keep half, or rather more, of the roof light covered with blinds, running lengthwise; also the chief portion of one side, and all on both of the sides furthest from the sitter, which are a little lower than the rest. The shutters opening towards the sitter, although in some respects useful, will, we fear, have the disadvantage of dividing the light, so as to cause some of the confusion of image arising from several sources of light. The sunshade will, we should think, be very useful. A system of screens we described on p. 50 of the present volume, January 29th, will, probably, in such a glass house as yours, be found useful. From your second letter it appears that, by reducing your quantity of light, the results are better. From careful and extensive observation we become daily more convinced that light admitted from a large window, especially if it be much in front, destroys both brilliancy and modelling, with very slight advantages as to shortness of exposure. The great object should be to concentrate the light, to narrow the source, but to take care that all entering the room reaches the sitter direct. This is the secret of brilliancy and modelling; much diffused light has a tendency to produce deposit in the shadows, and render necessarily a great deal of intensifying in order to secure a good printing negative. The general working arrangement and appearance of your studio appear excellent. We will write to you.

L. A. D.—If you had sent us an example of the markings, or stains, to which you refer, we could have probably pointed out the cause; but stains of slightly varying character occur from so many causes, it is difficult to speak certainly from mere description of their character. Turpentine and whiting answer well for cleaning the plates of rolling presses. Coating them with wax, when not in use, prevents rust.

ERRATA.—Dr. Phipson, London, correspondent to *Le Moniteur de la Photographie*, calls our attention to the fact, that in an extract from that journal, in our last, an error occurs which alters his meaning. Instead of saying the majority of the contributions were *beneath* mediocrity, it should have been *above* mediocrity. In translating the passage hastily, *au dessus* (above), was, we presume, mistaken for *au dessous* (beneath). He also qualifies his praise of Lady Hawarden's work, by restricting it to the art qualities of the picture. He is unwilling to do the contributors generally the injustice of underrating their works, and we are glad to record his favourable opinion.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. WILLIAM BARNETT, Falmouth, Cornwall.
Two Photographs of the Premises in Flushing, in which Robert Porter, a Lunatic, was confined.

MR. AUGUSTUS FREDERICK LAFOSSE, 91, Great Ducie Street, Manchester,
Three Photographs of Rev. Dr. Spailing.

MR. JOHN BERNIGER, Helston,
Photograph of James Clarke, Esq., deceased, late Mayor of Helston.

MR. JOHN FREW, 7, Railway Terrace, North Shields,
Photograph of W. S. B. Woolhouse, Esq., F.R.A.S., of London.

MR. A. S. WATSON, 2, Regent Road, Great Yarmouth.
Photograph of Captain Briggs.
Photograph of Rev. John Surgeon.
Photograph of the late Lord Hastings.
Two Photographs of Rev. R. Gooch.

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THE PHOTOGRAPHIC NEWS.

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IODIDE IN THE NITRATE BATH, AND PINHOLES.

On another page, we publish a further instalment of Dr. Vogel's experiments, in connection with the behaviour of iodide of silver in the nitrate bath, in which more interesting facts are stated. It will be seen from these experiments, that whilst a new bath with its capability of dissolving iodide of silver, not quite satisfied, will probably yield a film not possessing as much iodide of silver as the decomposition of the salts in the collodion should have formed, a portion of the iodide of silver at first formed being re-dissolved, it happens on the other hand, that with a bath fully saturated, the plate may bring out of the bath not merely the full proportion of iodide of silver formed by the iodides in the collodion, but also an excess derived from that dissolved in the nitrate solution, and that the density of the resulting negative is materially affected by these conditions.

Regarding the question of pinholes produced by the excess of iodide of silver and other causes, Dr. Vogel intends to detail some experiments at a future time. Referring to our own remarks on this subject a few weeks ago, we may now repeat what we have often before said, that the causes of pinholes are very numerous and varied: dust; glass plates with rough, imperfect surface, especially when that surface has been cleaned with nitric acid; turbid developers; the use of bath solution for intensifying; excess of silver and over-rapid reduction in intensifying; the formation of oxalate of silver in the bath from the continued use of decomposed collodion, &c. All these causes we have before pointed out; but we believe the most fertile cause in summer, the time when these pinholes are most troublesome, is the combined effect of rapid exhaustion of silver, and increased temperature in reducing the power of the bath to hold in solution the iodide it contains. This induces two conditions causing pinholes, the first the turbidity caused by a precipitation of iodide of silver, to which we have already referred, and the second a more complex one, not always so apparent or so easily examined; we refer to the formation of needle-like crystals, apparently of iodo-nitrate of silver. When the bath is in the supersaturated condition to which we refer, the sides of the bath and dipper, especially if they are of gutta-percha, will be found coated with these needle-like crystals. A collodionized plate left in such a bath for a few hours will be found studded with these needle-like crystals, standing out at right angles, about the sixteenth of an inch long, and a distinctly formed pinhole at the base of each. It is difficult to isolate these crystals, but on carefully separating a few and placing them in water, they dissolve, producing a turbid solution, apparently of nitrate of silver holding particles of iodide of silver. The remedy for this condition of bath is dilution with water, filtration, and then the addition of nitrate of silver in proportion to the water added to make up the strength.

The rapid dilution or heating of the bath appears to decompose the iodo-nitrate of silver formed by dissolving iodide of silver in the bath, precipitating particles of iodide of silver, whilst its gradual sur-saturation induces the condition in which the iodo-nitrate crystallizes out of the solution. A contemporary, speaking of the particles of iodide of silver precipitated by a slight dilution of the nitrate bath, says they are so small that thousands of them would be necessary to make one pinhole, and expresses a conviction that the cause of pinholes, although doubtless associated with the sur-saturation of iodide of silver, is generally *in* the film and not caused by the action of turbid particles on it. In reference to this, it is only necessary to point out the fact that a plate, on being immersed in a nitrate bath turbid with particles of iodide of silver, would at once receive a greater or less deposit of them; the due formation of the layer of iodide of silver in and on the film would proceed, to some extent entangling and embedding these particles in the coating. The film, where these particles were present would, of course, be as sensitive as the rest, as they consist of the same material, and it would not be until after fixing the negative that the pinholes would become apparent, as it would be by the dissolving of these particles embedded in the general layer of iodide of silver that the continuity of the film would be destroyed and the pinholes made apparent. Photographers know that this is frequently the history of pinholes; and that the majority of them are not apparent until after the fixing operation has taken place. The proof of the effect of these particles of iodide of silver is very easy. Let any doubter throw a piece of iodide of potassium into a bath which is working well, and whilst quite turbid, and without filtration, take a negative. He will meet with as rich a crop of pinholes as he can possibly desire; so rich, indeed, that he will probably most carefully eschew henceforth the slightest approximation to the condition of bath by which they had been produced.

BLURRING, HALATION, &c.—OPACITY OF SENSITIVE MEDIA.

Most photographers are familiar with a certain kind of blurring, in which the more brilliantly illuminated portions of the picture, such as the sky, seem to trench upon or overlap the less illuminated portion in immediate contact with them. There are several forms of this encroachment of light somewhat similar in result, but sufficiently distinct in character, and probably different in cause. There is the well-known fringe or halo of light, which is often seen around a window with a strong light in a dark interior. There is a similar halo sometimes seen on the dark portions of drapery im-

mediately around a large expanse of very white shirt front. There is the peculiar line of light, known generally as *halation*, often seen in portraiture between the background and some very dark portion of the figure. And there is the blurring in which sky encroaches on the darker portions of the picture, sometimes almost or entirely obliterating the finer twigs or branches of trees extended against the sky.

It is not easy to account in all cases satisfactorily for the irregular and unnecessary action of light in any of these forms, or to point out a certain remedy. The halo surrounding the window in a dark interior is generally attributed to the combined action of diffraction and reflection; the effect may generally be seen on the ground glass before exposing the plate, and the best remedy appears to be to avoid giving prolonged exposure to the window in question. If the window be readily accessible from the outside, it is a good plan to cover it up with a dark cloth during a great part of the time of exposure, uncovering it for a brief space toward the end of the time. We have seen cases in which a bright window directly opposite the camera was surrounded with this halo so strongly marked as to spoil the picture in every negative. The expedient of covering the window during an hour's exposure, which the interior required, and uncovering it for a minute or two at the end of the time, proved a completely successful remedy.

The halo of light which is seen surrounding a very white object, such as a white shirt front, &c., appears to be produced by the light thrown off, or reflected from the white object, on to surrounding parts, although it is somewhat difficult to understand the extreme action produced, and it is a noteworthy fact that it used to be much more common when simply iodized collodion was used, than it is now, when the use of a bromide has become common.

The peculiar phenomenon known as halation, consisting of a line of light surrounding dark objects, is, we believe, due to chemical or physical causes. When the developer comes into contact with the free nitrate on a part of the plate containing a dark object, there is little tendency to reduction, because the action of light on the subjacent iodide has not induced the necessary conditions; but the moment the free nitrate and developer come into contact with a part where light has acted, not only is the free nitrate belonging to that part at once reduced, but the free nitrate swept from the dark part where it could not be reduced, is at once thrown down, forming on the edge of the lighter portion a line of increased density, shown in the print by a line of light, or a fine halo round the dark parts. This tendency is greater in some conditions of the chemicals, not quite well decided; but we have remarked it most frequently, when the collodion has possessed but little bromide, and the plate has been slightly under-exposed.

The blurring produced by the encroachment of the light from the sky on darker objects, and sometimes partially obliterating them, appears more difficult to explain. It is a fault not unfrequently observed in tannin plates. In a recent answer to correspondents we recommended the use of a larger proportion of bromide in the collodion, believing at the time that this was the remedy recommended by Major Russell. We had, moreover, noticed this tendency was common in the wet process, when a simply iodized collodion and pyrogallic acid developer were used. Major Russell wrote to disclaim this remedy, and remarked that he was disposed to adopt the theory recently put forward by Mr. Sutton, that this blurring was the result of light, which had passed through the sensitive film, and was reflected on to it again from the back of the plate. In a further letter he stated some experiments which appeared confirmatory of this idea. Although this theory is very ingenious, we demurred to it for certain reasons, which, Mr. Sutton thinks, we have written hastily, and without due consideration. We may be in error in the matter, but our opinion on the subject is not hastily formed, or ill-considered.

The idea of blurring or halation being the result of reflection is not a new one. Something more than three years ago, Mr. Marlow contributed a paper on the subject to the Photographic Society, in which he attributed what he termed halation to reflection from the back of the glass, sending specimens and diagrams to prove his position, and recommending the application of black varnish to the back of the plate as a remedy. At the meeting at which this paper was read, a strong impression prevailed that the theory was not made out, that the sensitive film was not sufficiently transparent to actinic rays to admit of a reflection of any actinic value, and that halation was due to some other cause. Earlier than this, the possibility of blurring being the result of reflection from the back of the glass, had been referred to by Mr. Rothwell, but only to express a conviction that the amount of light which could be reflected by such means must be altogether inconsiderable, the blurring arising, in his view, from the action of outstanding rays not brought to a focus, which in a prolonged exposure have time to mar the definition of the image already produced by the rays in focus. This view of the matter has, we believe, been taken by Mr. Malone and some other photographers.

It is possible that some such action may arise from this cause, and also possibly from the alleged reflection, and it is held by some that the said blurring might be produced by the diffraction produced by using an extremely small stop; but we are disposed to attribute the blurring to other causes. If it were due to the alleged reflection, it ought to be found only in the margin of the plate and not in the centre, where the incidence of the light is nearly at right angles; whilst in the examples of this fault which we have seen, it is as apparent in the middle of the plate as at the margin. It ought also to be more apparent in films having the least opacity, such as albumen plates, in which we do not remember to have seen it at all. It ought not on this theory to be observed in daguerreotypes at all; nevertheless, we have seen a similar effect produced by over-exposure on silver plates.

We do not attempt to dogmatize on the subject, but we are disposed to regard it as the result of chemical or physical action rather than of optical causes, for several reasons. We have more frequently received complaints of its presence with the tannin process than with other dry processes, and we have found it present in the wet process under some conditions, and absent in others; and that independently of the opacity or transparency of the film. It has appeared to us frequently to result from a tendency to lateral reduction or spreading of the deposited silver, a fine line, like a twig, stretching across the sky, has thus an encroachment of deposit on each side of it, filling it up and partially or entirely obliterating it. This more frequently happens where the exposure has been long, and the development is rapid and energetic, than when it is slow and gradual. With a simply iodized collodion the reduction is generally more rapid and energetic than when a bromide is present, and we have noticed a greater tendency to this blurring with the iodized collodion. The presence of a bromide renders the development more deliberate, and the tendency to lateral deposit appears to be lessened. Major Russell states that he has not found the addition of bromide in tannin plates remove the blurring, but in plates prepared with a collodion containing bromide only, the blurring was less apparent. With some kinds of collodion, and in some conditions of the bath, the tendency is greater than with others. Mr. Hardwich mentions a number of causes all chemical. But so far as we have been able to observe, this tendency of the deposit to spread laterally, when the exposure has been prolonged and the development is energetic, has been a very common cause.

Regarding the opacity to actinic rays of sensitive surfaces, we may simply remark that the theory is not ours, but is held by some very able physicists; and that it is true to a very great extent practical photographers are well aware. Dr. Diamond stated, when Mr. Marlow's paper was discussed,

that a couple of excited plates were sufficient to supply the place of the orange glass in an Archer's camera, no effect whatever being produced on the exposed sensitive plate in the camera. He also stated that the halation which Mr. Marlow attributed to reflection from the back of the glass occurred in paper negatives under certain conditions. Mr. Crookes states that he has repeatedly found transparent films of photographically sensitive bodies were quite opaque to actinic rays. We have recently coated a plate on both sides with collodion, excited it, and exposed to unlighted object, which gave a very vigorous negative; on developing the other side, however, there was no trace of action whatever. Of course we should expect that a very prolonged action would produce some effect, as in the case mentioned by Mr. Sutton, where two sheets of sensitive calotype-paper were placed in the same frame, that behind the other showed some traces of the image. Mr. Sutton asks, if sensitive plates are opaque to actinic light, why camera makers supply a blackened sheet of metal to place between the plates in a double back? There are various reasons of convenience for interposing something between the plates, and camera makers always very naturally make everything belonging to the inside of a camera black; but if this were the only argument on the subject, we should not regard the practice of camera makers as very conclusive on the matter.

All the points embraced in this inquiry are of sufficient interest to be worthy of investigation, and we should be glad to hear the opinions of any of our correspondents, who may have given attention to the subject, as we are more anxious to elicit the truth, than to substantiate our own theories.

PRINTING IN CARBON.

BY H. COOPER, JUN.

Our first subject this week will be the adaptation of carbon prints to articles of jewellery, &c. What we want to do is to prepare an opaque white tissue, and to transfer the print on to it. As regards the substance that is best for mixing with the gelatine solution, I have had only a limited experience. I was very successful with chinese white, but I have an idea that fine precipitated chalk would answer as well as anything, and its trifling expense is a recommendation. The exact quantity to be used is quite immaterial, the best guide as to the appearance of the tissue that I can think of at the moment is opal glass.

Having thoroughly incorporated the white pigment with the gelatine, and carefully strained it, a collodionized glass is to be coated with it in the same manner as for Mr. Swan's process, with the exception that the layer of gelatine need not be so thick. There are three ways in which the prints may be transferred on to this opalescent tissue. The first is, as soon as the gelatine has set, the prints, which must not have been allowed to get quite dry, are placed face downwards upon the gelatine, and air bubbles having been removed by the means described in the former part of this article for preparing paper for the new modification of the carbon process, the glass plate, with the tissue and print upon it, is to be set by in a warm place, to which there is a free access of air, for four or five days to dry. The paper on which the prints were mounted may now be removed, by moistening with benzole, and the tissue strip from the glass. My readers will doubtless be surprised at the length of time required for drying; but if they will remember that the layer of gelatine is enclosed between two films of collodion their astonishment will vanish. In the second mode, the tissue is allowed to become dry, and the damp prints are then pressed upon it; they will be dry in a few hours. Notwithstanding the rapidity of the latter method, I prefer the first for beauty of result, as the slight inequalities of the print make their own bed in the soft gelatine, so that the print is perfectly even on the collodion side.

In the third way, the tissue, when dry, is removed from the glass, and may be kept in stock; and the same method of treatment is to be adopted as in the second.

The prints, being mounted upon a pliable tissue, may be cut to any form, and set in brooches, rings, bracelets, &c., and may doubtless be applied to many other elegant uses. Should the lights of the picture be preferred of a slightly pink tone, a very small portion of carmine may be added to the white pigment. For transferring carbon prints in the ordinary way, cards enamelled with fine barytes and gelatine size are the most perfect articles I have yet met with. I dare say some firm, such as De la Rue's, would prepare them commercially, if there were any demand for them.

Before leaving this part of our subject, there is another point I am desirous of directing the reader's attention to; that is, the occasional yellowness of the collodion in carbon prints. For a long time I was much troubled with it, and imagining it to proceed from the collodion pertinaciously retaining a small trace of bichromate, I over-printed some pictures so as to allow of about ten hours' washing, when I was pleased to find my annoyance disappear. I shall be glad to hear if others have met with this evil, and if so, to what they attribute it, after having attempted to ascertain by experiment, whether their ideas will stand the test of probability. The retention of the bichromate seems to me to be the easiest solution of the difficulty. Some collodions, from their structure, might be more liable to retain any substance in their pores, but it is interesting to notice that I used the same collodion for all my experiments, viz., Mawson's.

We now come to prints in polychrome, but I must warn photographers that to produce successful results, a great deal of care, patience, and delicate manipulation are required.

Those who do not possess the two first-named qualifications need not read any farther, as it would be a mere waste of time.

We will suppose that we wish to produce a photograph of a marble bust or statue, the shadows of which shall be a cool grey, with a deep crimson or other warm coloured background. To form the first tint, use a little red, blue, and yellow, and when the colour has been mixed to the proper tint, a small quantity is to be added to the gelatine solution; for the grey film, use only a very small proportion of bichromate, as it will be readily seen that the solution first applied will have to be kept the longest, and supposing the same quantity of bichromate were added to both, the first would be much more sensitive to light than the other.

A great deal depends upon the thickness of the first tissue, as a vast difference of result will be produced by a thin and thick one.

The negative should have nearly clear glass for the background, and the deepest shadows of the statue should have an appreciable deposit upon them, or, in other words, the tint of the background on a silver print from the negative should be considerably darker than the deepest shadows of the bust or statue.

To prepare the tissue, coat a glass plate with collodion, then with a *thin* layer of grey gelatine, and when the latter is dry, again coat with a gelatine solution containing a large quantity of crimson pigment, and as much bichromate as the gelatine will bear without becoming spontaneously insoluble. The reason for this is, that the light directly it reaches the second tint may render sufficient of it insoluble before the deep shadows of the object have had time to get printed through the first layer of gelatine. Of course, the time required for the light to penetrate the first layer, will depend upon its thickness. That any colours may be used is self evident, and hence the great variety of effects to be produced. One of the most pleasing and fascinating, is that of a delicate red rose, with green leaves. The myriad of delicate half-tones about the leaves of the rose being quite beyond the scope of the pencil of the artist.

From this hurried sketch of the process it will be seen that the difficulties are great, but they may be overcome with patience, and the results are so novel and startling that they are sure to please.

I would advise those who have time, to work well at the effects to be produced with two colours, and then to attempt three, though necessarily the difficulties are much increased by the addition of another tint.

I am convinced that a great deal may be done by skilled operators in the line just pointed out, and that only by skilled operators can successful results be produced. By chance a good picture might be obtained by bungling hands, but there would be hundreds of failures. To continually produce the first layer of the same thickness, a measured quantity of a solution containing a definite amount of gelatine, colour and bichromate, must be made to cover a certain number of square inches.

I am sorry this paper was not before my readers last week, but having been engaged otherwise, I could not find time to conclude some experiments necessary to enable me to make up my mind on some doubtful points; and even now I shall have to write—To be continued at some future time.

THE BEHAVIOUR OF IODIDE OF SILVER IN THE SILVER BATH.*

BY DR. HERMANN VOGEL.

We know that a fresh bath containing but little iodide of silver robs the plates prepared in it of a part of their iodide; therefore, the plates contain *less* iodide of silver than the salts used in preparing the iodized collodion ought to form. On the other hand, a bath containing much iodide of silver, adds to the amount of iodide of silver in the excited plates, by precipitating on them a part of the dissolved iodide contained in the nitrate solution.

I have observed this fact in a very striking manner on a pure bromized collodion, containing one per cent. of bromide of sodium. Prepared in a pure solution of nitrate of silver, composed of one part of the salt in ten of water, the plates appeared blue and transparent; but in a bath containing a large quantity of iodide of silver they took a yellowish tone, in consequence of the iodide of silver precipitated on them. The practical action of the bromized plates when used for photographic purposes illustrated the same fact; those prepared in the pure solution of silver giving but pale and feeble negatives, whilst the plates excited in the bath containing iodide of silver in solution, were of a much greater intensity.

The formation of iodide of silver in the film is easily explained. A prepared plate being brought into the silver bath, a part of the latter enters the porous coating of collodion, and gives up its silver by forming iodide and bromide of silver, with the salts of the collodion. But the nitrate solution is thus weakened, and thereby it loses the capability of dissolving the iodide of silver, which will be precipitated in the collodion. When the bath is fresh, the precipitated iodide of silver will be dissolved again on moving the plate in the bath, but when old and saturated with iodide of silver, it will not dissolve the latter, which then will remain in the plate.

Therefore, plates prepared in a bath containing much iodide of silver, always will appear to possess more body, and will give negatives of greater intensity than those prepared in a bath with little iodide. Of two baths containing 10 per cent. of nitrate of silver, one with 0·35, the other with 0·57 per cent. of iodide of silver, the other circumstances being the same, the latter gave negatives of much greater intensity.

Of course nobody would, following these experiences, saturate his bath with iodide of silver in order to get a greater intensity of negatives, for by so doing, other evils would often be occasioned, such as turbidity of the bath, &c.

I subjoin here the numeric results of my researches on the quantity of iodide of silver in several baths, partly composed by myself, partly taken from practice.

* Continued from page 283.

1. *Baths free from Alcohol.*

a. The bath, above mentioned, which was mixed with water until it became turbid, contained, in this state, at a temperature of 16° C.=60° F., in 100 cubic centimeters—

Nitrate of silver	... ...	10 grammes
Iodide of silver	... ...	0·053 „

b. A 10 per cent. bath which was left at rest some days with a surplus of iodide of silver at 50° F., contained in 100 cubic centimeters—

Nitrate of silver	... ...	9·94 grammes
Iodide of silver	... ...	0·057 „

c. A third bath containing about 12 per cent., contained in 100 cubic centimeters—

Nitrate of silver	... ...	12·85 grammes
Iodide of silver	... ...	0·077 „

2. *Baths containing Alcohol.*

a. A bath of a practical photographer, composed at first in the proportion 10 per cent., some weeks used, and then set apart because it became turbid, was found to contain in 100 cubic centimeters—

Nitrate of silver	... ...	8·85 grammes
Iodide of silver	... ...	0·050 „

b. Another bath used a long while until it gave weak negatives, contained—

Nitrate of silver	... ...	11·60 grammes
Iodide of silver	... ...	0·085 „

As will be seen, this bath contained a much greater quantity of iodide of silver than the rest, even than the bath containing 12 per cent. of nitrate. This easily may be explained by the presence of alcohol, taken up by the bath from the plates prepared in it.

But in all cases the quantity of iodide of silver is but little, and does not reach 1 per cent. of the quantity of nitrate of silver.

From these results, it follows that a bath may become useless, even containing a great quantity of free nitrate of silver.

(To be continued.)

INSTANTANEOUS PHOTOGRAPHY.

I propose to communicate to you some experiments recently made, which may, perhaps, prove useful to many of your readers. Like many other photographers, led away by specious advertisements, I bought some "instantaneous collodion." I do not say that it was bad, but bromo-iodized collodion, the formula for which may be found in all treatises on photography, has always given me results quite as good and rapid, and when I think of my purse, I say better. Well convinced that the collodion went for little in this matter, provided that it was of good quality, and perfectly neutral, I occupied myself principally with lenses and baths. Like every one else, I remarked that a slightly acid silver bath gave excellent results; but that these results were so fugitive and uncertain, that although on one day I could operate with all the rapidity desired, next day, without knowing why, I found myself in the ordinary position. What was wanting, was a bath that would work uniformly. It came into my head to take an old bath, still strong enough to give a good negative with the usual exposure; I left it several days in contact with carbonate of silver, as already recommended by M. l'Abbe Laborde. The first proof I took was *fogged:* litmus paper gave no signs of the presence of acid. I added a trace of nitric acid, by dipping a glass rod into a bottle of nitric acid, and then into the silver bath. This infinitesimal quantity could not be weighed; but I repeated the operation until the litmus paper turned slightly red. With this bath, I obtained a splendid proof, but a little under-exposed.

I then used a quick lens, 2½ inches in diameter, and 5 inches focus. With this objective and an internal diaphragm of 1 inch, I obtained a *carte* bust in two seconds. I operated

in a glass room: evidently, if objects be taken in full light, and placed at a considerable distance, the exposure would be instantaneous.

The result was the same with the various collodions I tried. I must add that the developing solution was composed of:—

Water	1000	parts
Ammoniacal sulphate of iron	20	„
Acetic acid	30	„
Alcohol	20	„

This was prepared the same day, and I make a practice of employing only boiled water for this solution, in order to prevent a portion of the salt of iron from passing to its maximum of oxidation.

It seems to me clearly shown that it is the state of the coating of silver which adheres to the iodide and renders it sensitive, that has the most marked influence upon the rapidity of the exposure. But this sensibility must be aided by a very luminous objective of short focus, which was just the condition of the objective I employed.

From the time of making this experiment, I have every day returned the silver bath to the bottle containing the carbonate of silver; every day I have added a little nitrate of silver by the method described above, because the contact of the carbonate neutralizes that contained in the nitrate bath, and since then matters have proceeded in the most satisfactory manner.

Further experiments have enabled me to prove the fact announced by M. Monckhoven, viz: that in order to obtain proofs rapidly, it is indispensable to sensitize the plates in complete obscurity, otherwise, we shall obtain only a weak picture without contrast or detail, and to which, moreover, it will be impossible to give the requisite intensity. This being fully understood, I now proceed to detail my new experiments. I employed a lens of 2½ inches in diameter, and 5 inches focus; it is very luminous, and of very short focus, which for very rapid or instantaneous proofs, is the first condition that such an apparatus must fulfil.

Wishing to verify the accuracy of the statement, that the rapidity of the impression depends more upon the condition of the silver bath than upon the collodion, I took some collodion nearly a year old, and submitted it to the treatment recommended by M. Jose Fernandez Celis, in the *Eco de la Fotografia*, of putting some bicarbonate of soda in the bottle containing it;* in this way it becomes colourless in about twelve days, or rather, of a pale sherry colour. This operation also completely neutralized all the acid that had formed in the collodion. Sensitized in the bath prepared as above described, it gave me, in five seconds, a negative in the interior of a room. As I found that the film lacked tenacity and substance, I added some newly prepared collodion, and a little iodine; then my proof left nothing to be desired, either as to intensity or rapidity.

I made, at the same time, an experiment which proved how much service M. Meynier, of Marseilles, has rendered to photography, in pointing out the double sulphate of iron and ammonia as a developing agent.† While seeking for old collodion to make the experiment mentioned above, I came across a bottle of ammoniacal iron bath, of the same age as the collodion employed. The bottle was uncorked, the liquid was of a pale amber colour, and contained, according to the label, citric acid, in lieu of acetic acid. I attempted to develop a negative with this solution, and except that the picture was rather slow in making its appearance, I found that it acted as well as a freshly prepared solution, notwithstanding which, I should always recommend a newly prepared developer for rapid or instantaneous proofs, composed as I have already indicated: I never experienced failure from this source.

When the exposure is only the fraction of a second, the negative has seldom or never the requisite intensity at first; it must be strengthened or *intensified;* for this purpose, I employ the iron developer instead of pyrogallic acid. I thus avoid the horrible black hue produced by the pyrogallic acid, and find that the negative had more softness, and is less harsh in its contrasts; in fact, gives better proofs. But one precaution, known to every one I am sure, is necessary, but which has not, to my knowledge, been published.

When the picture appears under the developing solution, I wash the plate, and cover the film with a solution of nitrate of silver, strength 2 per 100, which contains *the same proportion of alcohol* as the developing bath; then, after a moment, I pour on the iron bath without *ever mixing* the two liquids in the glass. The addition of alcohol to the weak solution of nitrate of silver is indispensable, if we wish to avoid stains; it demands an extraordinary dexterity of hand to avoid stains without it, for the nitrate of silver does not immediately mix with the liquids which the film has imbibed or which covers it, and flows over the surface as though it were oily. We can succeed in immediately moistening the collodion only by prolonged washings which may compromise its adherence to the glass plate. This addition of alcohol to the weak solution of nitrate of silver ought, I repeat, to have been known to photographers long ago, who do not employ pyrogallic acid to intensify their negatives. For if we mix the silver solution with the iron developer, instead of pouring it on the plate separately, the reduction of the silver takes place in the glass, and gives us a grainy or pinholed negative, an inconvenience which does not occur with the method I have pointed out, but particularly when we employ ammoniacal sulphate of iron.

You will perceive, therefore, that the experiments I have made thus far, appear to indicate that rapid impression results rather from the nature of the liquid which bathes the film of iodide of silver, than from all the other agents employed in photography, and what we must especially seek is to remove all free acid from the collodion; in the silver bath there must be only a trace, and with these conditions fulfilled, I believe failure will never occur.

I propose to experiment with a collodion made with an alcohol which reddens litmus paper; when these experiments are concluded I shall communicate them to you, if they possess any utility. L. P. de C.

Le Moniteur de la Photographie.

* A remedy very old in this country.—Ed.

† We suggested it some months earlier in the News.—Ed.

PHOTOLITHOGRAPHIC HALF-TONE.

BY J. W. OSBORNE.*

At the present time, when the attention of those interested in the progress of the Graphic Arts is much directed towards photolithography, two or three forms of which we know to be practically useful, the question is often asked by professional photographers, as well as by those who possess but a general knowledge of such subjects, "Why do we not see something of photolithographic half-tone? How comes it that while reproductions from stone, of engravings, etchings, and pen-and-ink drawings, are comparatively common, and sometimes all that can be desired, photolithographs of landscapes, portraits, or paintings, are hardly ever to be met with?"

To answer such questions at length, discussing the merits of the several processes which have been proposed from time to time, for the solution of this problem, would occupy more space in the *Photographic Mittheilungen* than would perhaps be agreeable to its readers; at the same time a few general remarks may tend to throw some light upon the subject, and not be thought devoid of interest.

Three circumstances should be taken into account, if, by the help of actinic action as the primary means, we endeavour to produce at will upon the surface of a lithographic stone, a drawing possessing that gradation from black to white

* *Photographische Mittheilungen.*

which is known as half-tone, in a condition capable of yielding copies in the press without deterioration or change. These are, the printing capabilities of the stone; the nature of the printing ink; and the peculiar character of the half-tone possessed by the photographic negative or positive as the case may be. Whatever process we employ these circumstances remain tolerably constant, and essentially effect the result.

The power possessed by those portions of a lithographic stone which constitute the drawing, and which are therefore capable of attracting and holding the greasy ink, is subject to but slight variation; for all practical purposes such places must be regarded as receiving and retaining one and the same amount of greasy matter when treated uniformly by the roller. It is therefore impossible, aided by our present knowledge, to impart to different parts of a continuous printing surface, varying degrees of affinity for the ink proportionate to the numerous shades required, an impression from which would have the appearance of a graduated drawing in washes of indian ink. Lithographers are, in consequence of this fact, obliged to produce their tints and shades by non-continuous surfaces, that is, by assemblages of dots or other markings, differing in size, and separated from each other, by intervals greater or less, according to the shade required. Each of these points lays hold of its full quantity of ink, but in proportion as they are small and distant from each other, or large and close, the tone varies from light to dark. In general the artist working on stone gives to his shadows this necessary non-continuous character, by drawing with a lithographic crayon upon a surface to which a "grain" has been imparted. Such a surface consists of an infinite number of uniform asperities, which, in proportion as the chalk is applied with greater or less force, hold it in larger or smaller masses at variable distances from each other.

In connection with the foregoing observations we have now to consider the nature of the printing ink employed in lithography. This substance, which consists essentially of viscid oily matter holding finely divided carbon in suspension, is perfectly opaque, and it must be so, or the small film which attaches itself to the stone would not cover the white printing paper sufficiently to give force and depth to the shadows. As above intimated, the power which the printing portions of a stone possess of accumulating ink upon their surfaces, is only variable within very moderate limits, and such variation as the printer brings about is more frequently due to his manual dexterity, than to differences in the intensity of the force which holds the greasy matter. Were we therefore to endeavour to produce the lighter tones of a drawing by the use of a pale translucent ink, the depth and opacity required for other parts of the same drawing would be unattainable, because of the large quantity of such an ink requisite for that purpose.

On the other hand, printing as we do with a perfectly black and opaque material, we find that the quantities of the same required for rendering the lighter shades are so infinitely small, that they could not be applied by the ordinary mechanical means. Thus we are again obliged to have recourse to a grained surface, the depth of colour upon any portion of which depends upon the relation between the amounts of absolute black and white determined by the artist. The minutness and proximity of the black particles composing a shade has a limit, or coalition will not be prevented, and clearness preserved while printing, a limit which makes it possible for us to recognize even with the unassisted eye, a certain definite structure in every lithographic shade however finely drawn.

A photographic negative from a natural object, on the contrary, is made up of a number of tones or shadows absolutely devoid of structure, a close examination even with a considerable magnifying power, isolating no particles of appreciable size, which, in the aggregate, possess the character of a grain, or which could impart one to a sensitive surface exposed under it.

Delicate imperceptible gradations, as they exist in nature, characterize every good photograph, and constitute its charm also; and herein lies the great difficulty the photolithographer of half-tone has to encounter. The light, as it filters through such a negative, may produce upon the sensitive surface exactly the kind of action required, proportionate in its intensity to the transparency of the different parts of the collodion film; but as has been shown, the lithographer cannot print such tints, he must break them up into numberless distinct particles of various sizes, and at various distances from each other, as that is the only means he has of producing gradation, and he must accomplish this in such a manner, that the general application of one and the same ink to all parts of the drawing will yield proofs in the press, which deserve to be called pictures.

This is a difficult problem to solve, but that eventually we shall have a practicable process of the kind, no person can entertain a doubt.

From what I have said, it must not be thought that nothing has as yet been accomplished in this direction. On the contrary, I may mention in the order in which they follow each other, the highly interesting results of Lemercier and Poitevin, in France; Cutting and Bradford, in America; Asser, in Holland; Col. Sir H. James, in England; and Toovey, in Belginm—from all of whom I have seen specimens. In fact, until the time of my own invention in August, 1859, when I demonstrated the value of photolithography for the reproduction of existing originals in simple black and white, without gradation, all the experimenters in this subject had devoted themselves solely to the production of half-tone, with more or less success. However, up to the present time, there is not, as far as I know, any process of the kind which may be said to have a commercial value, in this instance a fair criterion of success, because of the great facilities for introduction, and wide field of operations which the first practical photolithographic method of the kind will inevitably enjoy.

Berlin, May 16, 1864.

TREATMENT OF PHOTOGRAPHIC PAPER.

PAPER WITH CHLORIDE OF AMMONIUM AND WITH BICHLORIDE OF SODIUM.

Silver Bath.—Strength 1 : 6.

Gold Bath.—Double chloride of gold and potassium, 1 part; distilled water, 1000 parts.

Hyposulphite of Soda Bath.—

Carbonate of soda	1 part
Hyposulphite of soda	8 parts
Distilled water	80 „

Float on this bath from four to five minutes. The gold bath will not serve after it has lost its colouring properties: the proofs must be carefully washed before toning, and afterwards washed in water several times.

ARROW-ROOT AND MOSS PAPER.

Silver Bath.—Strength 1 : 6. Float from three to four minutes.

Gold Bath.—*Sel d'or* 1 part, dissolved in 500 parts distilled water, into which is poured in a thin stream, while stirring, a solution of—

Hyposulphite of soda	3 parts
Distilled water	500 „

Hypo Bath.—

Hyposulphite of soda	1 part
Distilled water	8 parts

The proofs are not put into the gold bath until after they are well washed, and passed through several waters before fixing.

If we have to tone proofs upon albumen, and others upon salted, arrow-root or moss prepared papers, the latter can be

* Continued from page 319.

toned in the same bath as the albumened proofs, but extending the time in the bath a little.

ALBUMEN PAPER.

Silver Bath.—Strength 1 : 5, and one or two drops of nitric acid to every 75 grains of silver. Float from two to three minutes.

Gold Bath.—For the blue-back tones, 2 parts bicarbonate of soda dissolved in 150 parts of distilled water, heated to 100° Fah.: stir in 6 parts of citric until no more bubbles are formed, and then add about 1½ parts of *sel d'or* per sheet. This bath may be employed immediately. For purple-brown and violet-brown tones: 1 part of borax in powder, dissolved in 30 parts of warm distilled water, and allowed to cool; add at the moment of using about 1 part of *sel d'or*, or ½ part of dissolved chloride of gold. This bath, when heated 90° Fah., is very active.

Hypo Bath.—Strength 1 : 5. When new, the solution bleaches a little; it is good to add one-fourth of a fixing bath already in use. The toue heightens in this bath, and account must be taken of this in passing to the gold bath. The albumen rose and amorphous papers, are treated in the same manner as the albumen papers.

The rose albumen paper loses its colour in all the baths; with a rather light paper we obtain proofs of a charming rose tint.—*Bulletin Belge de la Photographie.*

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

(Continued from vol. vii. p. 547.)

II. *What Influence is exerted by Foreign Substances on the Changes undergone by Chloride, Bromide, and Iodide of Silver when exposed to the Light?*

I come now to the solution of the second of the questions proposed above. That the presence of foreign matters exercises sometimes a favourable, sometimes an antagonistic, influence upon the chemical action of light has already been repeatedly noticed by previous investigators. Thus Scheele asserts the preventive influence of nitric acid, which, however, Wetzlar (*loc. cit.*) denies; the latter, however, declares that solution of sulphate of iron prevents, or at least greatly hinders, the blackening of chloride of silver.

Seebeck asserts (*Poggendorff's Annalen*, ix. p. 172) that chloride of silver is decomposed only in the presence of moisture, but not *in vacuo* or beneath sulphuric acid and alcohol.

Perchloride of mercury is capable of entirely preventing the blackening of chloride of silver, according to H. Rose.

With regard to iodide and bromide of silver there are but few special investigations. People have been contented with ascertaining the influences exerted by acids, silver salts, and other bodies in photographic operations, without troubling themselves particularly about the chemical and physical changes taking place in them.

Thus the favourable influence of nitrate of silver, and the unfavourable action of acids, upon the photographic changes undergone by chloride, bromide, and iodide of silver have long been known. But few experiments with *pure* bromide and iodide of silver are extant; and therefore we cannot wonder if the opinions enunciated with regard to the influences just mentioned are in the highest degree obscure. During the description of my experiments, I will more closely examine these views.

1. *Influence of Water.*

Several tubes with [wet] chloride, bromide, and iodide of silver were exposed simultaneously with the same salts in the dry state. The samples under water behaved in exactly the same manner as the dry ones. After long exposure to light, the water above the silver salts was tested; that from the chloride gave a distinct reaction of H Cl. This fact has already been observed by Scheele, Wetzlar, Hunt, and many others. I also found that the supernatant water of the bromide gave a reaction of H Br. The water from the iodide *did not give a trace* of a reaction, either in the case of $Ag\,I^{\alpha}$ or $Ag\,I^{\beta}$.

In order to ascertain whether *perfectly* dry chloride of silver behaves in the light otherwise than the air-dried salt, two test-tubes with chloride of silver were dried in the air bath in the dark, at 248° Fah., closed immediately with corks and sealing-wax, and then exposed simultaneously with two moist samples. Immediately after drying, the chloride appeared somewhat greyish white; on exposure, it acquired at first a greyish-blue colour, while the moist portion was more violet; but the greyish-blue tint of the former afterwards also passed to violet. No particular difference of intensity could be detected.

2. *Influence of Acids.*

Whilst water has no perceptible action upon the chemical change undergone by chloride, bromide, and iodide of silver in the light, acids exert a decidedly retarding influence upon it. This is manifested most strongly in the case of the iodide, and most slightly in that of the chloride.

a. *Experiments with Chloride of Silver.*

In respect of chloride of silver, many investigations have already been made upon the present subject (*vide suprà*). My experiments were made by placing chloride of silver in tubes in the dark, and adding various acids; the tubes were then exposed to the light simultaneously with chloride of silver in the dry state, and moistened with water, and after a certain time the colouration of the different samples was compared. In this way it appeared that the change of colour is not perceptibly hindered by the presence of acetic acid and of dilute sulphuric acid (one part water to five parts acid), but that nitric acid of sp. gr. 1·2 somewhat retards the colouration by light.

It is otherwise, however, with concentrated English sulphuric acid and yellow fuming nitric acid (of sp. gr. 1·4). I put the acids into shallow glass vessels, threw pulverulent chloride of silver into them, and laid slightly moistened chloride *under* the vessels. The portions of chloride of silver placed *beneath* the dark vessels with acid became darkened much more rapidly than those lying *in* the acid; this was the case also when the chloride of silver placed under the vessels was dry—a proof that here the conditions of moisture have no influence.

The retardation produced by nitric acid of sp. gr. 1·4 (yellow and fuming) upon the change of chloride of silver is due, *in part*, to an absorption of the chemical rays; for the chloride placed beneath the vessel is coloured more slowly than chloride exposed freely beside it.

Fuming sulphuric acid *entirely* prevents the colouration by light. Even after exposure for weeks, the chloride of silver beneath sulphuric acid remained perfectly white, whilst that placed under the vessel had acquired a violet colour. The latter effect, however, was produced rather more slowly than with chloride of silver lying open or covered with a glass—a proof that sulphuric acid likewise partially absorbs the chemical rays.

This prevention of the decomposition of chloride of silver by fuming sulphuric acid is certainly due to the fact that the chloride forms with anhydrous sulphuric acid a compound which is insensible to the action of light;* for I remarked that a portion of the chloride was dissolved in the fuming sulphuric acid. By exposure to the air and dilution, this solution became turbid, and white chloride of silver was deposited, which soon acquired a violet colour beneath the dilute acid.

* From *Poggendorff's Annalen.*

* Such compounds of anhydrous sulphuric acid with chlorides have long been known. H. Rose, for example, has demonstrated the existence of compounds of this acid with K Cl and Na Cl. (*Poggendorff's Annalen*, xxxviii., p. 120).

Protochloride of mercury exerts a similar influence; as has already been discovered by H. Rose, this salt completely prevents the colouration of chloride of silver, perhaps also in consequence of the formation of a componnd indifferent to light. This non-sensitivity of chloride of silver containing Hg Cl to the action of light is the more remarkable as both both bodies, *when alone*, are decomposed by light (Suckow, in *Poggendorff's Annalen*, xxxii. p. 293).

The action of sulphate of iron is interesting. According to Wetzlar (*loc. cit. suprà*), it prevents the colouration, "although in course of time the particles situated at the margin of the vessel become slightly violet." I have confirmed this observation, but also discoverced its cause, which consists simply in the fact that solution of sulphate of iron absorbs the greatest part of the chemical rays. This is easily ascertained, as chloride of silver placed beneath a vessel containing solution of sulphate of iron remains just as white as that lying in the solution.

b. *Experiments with Bromide of Silver.*

Whilst the influence of dilute acids upon the colouration of chloride of silver in the light of the sun is only very inconsiderable, it becomes much more perceptible in their action upon bromide of silver; and this is especially the case with regard to nitric acid. Various tubes containing bromide of silver, with acetic acid, dilute sulphuric acid, nitric acid, and citric acid, were exposed to the light, and the change undergone by their contents in a certain time was observed. By this means I found that the bromide under nitric acid acquired much less colonr in the same time than that exposed with water. The retarding influence of the other acids is but inconsiderable, although perceptible. It is interesting that bromide of silver which has become grey by exposure becomes lighter in colour by standing, and still more by boiling with nitric acid of sp. gr. 1·2. The greyish-violet mass then acquires a uniformly yellowish-grey tint. No solution of silver takes place.

Bromide of silver containing protobromide, prepared synthetically, shows the same behaviour.

(*To be continued.*)

ON THE FORMATION OF POSITIVE PROOFS.

(Continued from p. 331).

Fixing.—As we have previously shown, the proof, on removal from the printing frame, is formed of non-impressed argentic compounds, and of metallic silver, the mixture of which with the argentico-organic lake imparts a rich red-violet hue to the coloured portions. The fixing agents are intended to remove the non-reduced compounds, but they also produce another effect. A few moments after immersion in the fixing bath, the picture loses its violet colour, and assumes a decided brick-red colonr. For a long time, it was admitted, that in this case, the sub-chloride of silver, Ag^2 Cl, is transformed into soluble chloride, Ag Cl, and metallic silver in the fixing solution. We have shown that this phenomenon must be interpreted in another fashion: it consists in a simple hydratation of the argentico-organic lake, which swells upon contact with the alkaline fixing solution, by which its colour becomes modified. We realize, in fact, this change of colour, not only upon the photographic picture, but also upon the isolated argentico-organic lake, in exposing each to the action of water heated to 180° Fah., or to the steam of boiling water. Nothing similar to this occurs during the fixing of chloride of silver reduced by light.

The fixing agent most usually employed is hyposulphite of soda; ammonia and cyanide of potassium are objectionable for reasons which have been explained. The hyposulphite of soda, on the contrary, offers none, when carefully used; it readily dissolves the non-insolated argentic compounds, without sensibly attacking the portions acted upon by light, and leaves no sulphur compound in the proof, which will subsequently cause a change. The only precautions its employment requires, consist:—1st. Of freeing the proof by repeated washings in water of the excess of nitrate of silver remaining in it. 2nd. Of also removing from the proof the nitric acid, with which exposure to light has impregnated it. This is easily effected by the addition of bicarbonate of soda to the washing waters. 3rd. To keep the hyposulphite constantly below the limit of saturation by the salts of silver. In the operation of fixing, all the non-exposed argentic compounds on the sheet are converted into hyposulphite of silver, AgO, S^2O^2. This salt can remain dissolved only by favour of two equivalents, at least, of hyposulphite of soda; if they are not present, in lieu of the double soluble salt (AgO, S^2O^2), (NaO, S^2O^2), there is formed the salt (AgO, S^2O^2), (NaO, S^2O^2), which, being insoluble in water, leaves the proof impregnated with a sulphurizing element, which the washings cannot remove.

The study of the successive reactions accomplished during the fixing has enabled us to establish the practical conditions, and the methods adopted at the present day, by our advice, by most operators, guarantee to the proofs all the stability desired.

A new fixing agent, the sulphocyanide of ammonium, has recently been proposed by M. Meynier, of Marseilles; we have carefully examined the conditions of its employment. Every thing considered, this new agent appears to have marked advantages over hyposulphite of soda, but its price, still very high, prevents it being practically adopted.

Of Toning.—The operation of *toning* is that of all others which must occupy the most important place in an artistic point of view. The brick-red hues which the proof assumes in the fixing bath are not agreeable to the eye; the object of toning is to substitute more pleasing hues.

Many years ago, we pointed out the serious influence, in respect to fading in the proof, of old or acid baths of hyposulphite formerly employed to produce toning; the salts of gold, and particularly the chloride of that metal, are exclusively employed to obtain this result.

Toning with salts of gold, which takes place either before or after fixing, is due to the substitution of gold for the silver. Numerous experiments, performed under the most varied conditions, have shown us that gold replaces the metallic silver, and that which forms an integral part of the *lake*. In general, upon a toned proof, we find four parts of silver gilt by one part of gold; however prolonged its action may be, the disappearance of the silver is never complete; after thirty hours' contact with auriferous solutions frequently renewed, the picture still contains a quantity of silver which is about one-fourth the total weight of the metal which forms it.

The formulæ suggested for the preparation of the gold baths are innumerable; we have separated them into three well characterized classes:—

1. Acid preparations, in which figure hydrochlorate of chloride of gold, Au^2 Cl^3, Cl H of commerce, and to which more hydrochloric acid is sometimes added. In contact with these baths, the picture loses three equivalents of silver, Ag^3, which pass to the state of chloride, and takes two equivalents of gold, Au^2. In consequence of this disproportion between the quantities of silver removed and gold deposited, and also of the acid condition of the solution, the lighter portions of the picture often disappear.

2. Neutral preparations; these give very remarkable results; they are formed by taking double chloride of gold and potassium, Au^2 Cl^3 KCl, and exactly satnrating the small quantity of acid this salt may retain by chalk. Left to themselves, and properly diluted, baths prepared in this manner become colourless in four-and-twenty hours; the chloride of gold, Au^2 Cl^3, appears to be reduced to the state of protochloride, Au^2 Cl, while the excess of chloride disengaged has reacted upon the compounds present to oxidize them, and doubtless to transform the alkaline chloride into chlorate. The neutral gold baths work with great regularity, they effect the toning in a few minutes, and as for every two

equivalents of gold, Au^1, deposited, they remove only one equivalent of silver, Ag, from the proof, the tone of the picture gains in richness and vigour. Besides, these baths are always ready for use; by adding to them, at each new series of operations, a quantity of gold equal to that removed in the previous operations, their action may be prolonged indefinitely.

3rd. The alkaline preparations, which, by the addition of an excess of an alkaline salt, carbonate, acetate, or phosphate of soda, &c., have passed the point of neutrality spoken of. There is, also, it appears, a reduction of the chloride of gold, $Au^2 Cl^3$, to the state of protochloride, $Au^2 Cl$; but in presence of excess of alkali, this protochloride acquires a singular stability. In the course of a few days, the bath is ill adapted to effect toning, although it still contains at least two-thirds of the gold introduced into it; and it is only during the period of the reduction of the chloride $Au^2 Cl$ that it yields good results.

On the Fading and Restoration of Positives.—In a *mémoire* presented to the *Académie*, in 1855, we showed that fading, that is to say, the changing of photographic positives to a yellow colour, is the result of their sulphuration. Recent experiments have enabled us to verify this theory anew. All the faded proofs contain a quantity of sulphur often corresponding to the proportion of silver colouring them; and every proof submitted to the simultaneous action of sulphurizing compounds and water fade and become yellow.

The yellow colouring of the sulphured proofs has always appeared difficult of explanation. For, as is well known, the sulphide of silver in a very fine state of division is violet black. We have been so fortunate as to find the explanation of this fact in the influence of the organic matters employed in sizing the papers. When sulphide of silver is precipitated in presence of albumen, it is not the above black compound that we obtain, but rather a yellow matter which contains both sulphide of silver and organic matter. What is then produced is also what takes place on the proof, and the yellow colour assumed by the latter in this case is nothing else than the result of the sulphuration of the argentico-organic lake. Sulphurizing compounds from three sources will cause fading in the proofs: these are, 1st, old hyposulphite baths, acid or saturated; 2nd, hyposulphite of silver left in the proof in consequence of insufficient washing; 3rd, atmospheric sulphuretted hydrogen. The first two causes of sulphuration may be easily avoided by following the methods of fixing and toning indicated above; the third has but a very feeble influence, and when the proof has been very deeply toned by the gold, this influence becomes almost null; in any case it is inferior to the influence of hydrosulphurous emanations upon paintings. It results, then, from our experiments, that the fading is not the normal condition of positive photographs, and that it is quite easy by means of argentic compounds to produce pictures almost absolutely permanent. Moreover, when, in consequence of defective preparation, a picture turns yellow, we can stop its fading, and restore part of its original brilliancy by toning it afresh with a concentrated neutral solution of gold.

Treatment of Residues.—The immense development photography has obtained gives great importance to this subject. The quantity of silver consumed in the photographic art is enormous; in Paris alone, it reaches many millions of francs annually. Now, our analyses have proved that only 3 per 100 of the silver employed remains upon the proof in the coloured state, and 97 per 100 is irretrievably lost, if the photographer is not supplied with an easy and rapid method of treating his residues. A great many processes have been recommended for this object, we have tried them all, and have sought for new ones, and the one we recommend consists in the employment of plates of copper which, immersed in the argentiferous solutions, even those containing hyposulphite, precipitate the silver in a spongy state in the course of two or three days.

These researches, the principal points of which we have passed rapidly in review, establish with certainty that the formation of photographic proofs, notwithstanding its apparent complexity, is the result of ordinary chemical reactions. Under the influence of an alkaline chloride and a sizing, a surface of chloride of silver, of argentico-organic matter, and free nitrate of silver is formed on the paper. Light reduces this surface; the fixing agent, always alkaline, hydrates the argentico-organic lake, colours it of a brick red, and dissolves out the non-exposed portions; and lastly, the toning, by the substitution of gold for silver, converts the red and easily changed picture into one of an agreeable colour, and to which the unalterability of the auric compounds communicates an almost indefinite stability.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, July 20th, 1864.

The last meeting of our Photographic Society gave evidence of the near approach of the holiday season, both from the dilatory attention to business and the paucity of subjects introduced.

Mr. Pouncy exhibited some new specimens of his carbon printing process, but they appeared to be inferior to those already sent to the exhibition.

M. l'Abbé Salvy had promised a communication upon a process for printing positives without the use of hyposulphite, the fixing being performed by a simple washing; but the meeting was disappointed in its not being received.

M. Laulerie, the secretary, reminded the members of the society that during the first year of their organization a committee was appointed to examine the best conditions for the manufacture of positive and negative papers. The committee never exercised its functions, and now only two members remain out of five. The question arose, was it urgent to reorganize the committee?

M. Bertsch remarked that if the committee consisted of only two members there was more likelihood of their meeting and acting, for it generally happened with the committees appointed by the society that a sufficient number could never be got together to deliberate.

M. Regnault, the President, observed that paper for negatives was no longer much in request, consequently the interest in the matter had greatly diminished, while every one manufacturing positive paper took care to prepare it carefully. M. Bertsch referred to the taste for enlarged positives, as for himself he much preferred enlarged positives on non-albumenized paper. The conclusion of this discussion was, to invite all the manufacturers of positive papers to send specimens of their productions to the society, and then to appoint a committee to examine them. Mention was also made of a prize founded by the *Société d'Encouragement*, to reward the best production.

M. Faure confirmed a well-known fact, the priority of the observation of which is due to M. Humbert de Molard. Over-exposed positive proofs may be revived by submitting them to the reddening action of a bath of cyanide of gold and potassium. M. Humbert de Molard has thus restored to an artistic aspect proofs which exhibited nothing definite.

The effect is very easy to understand; a double action is set up, that of the solvent which is determined by that of the toning; the presence of the *sel d'or* is also indispensable.

M. Marion exhibited an arrangement of portfolios, which he named *sensitized plate-preservers*. They consist of glass bearing frames, arranged for operating in the open air with prepared plates, starting with any of the dry collodion processes. Each plate is contained in a screen, the face of which opens like an ordinary frame; this kind of portfolio adapts itself to the slide of the camera in such manner as enables the operator to expose the plate and remove it without its ever seeing external light, and afterwards developing the picture.

M. Dagron has made au ingenious improvement in the manufacture of his photomicroscopes. Hitherto, the optical arrangement, or Stanhope lens, was independent, and formed a separate piece, which was afterwards adapted to the object or ornament. Now, it is the stone of a ring, or pin, or other jewel, that forms the microscope. Thus all the false stones, or rather the coloured glass of which imitation jewelry is composed, are turned to account by M. Dagron. The process is thus described in the *Moniteur de la Photographie.*

The false stone receives upon one of its faces a given curvature, the focus of which is calculated; the opposite face is plain, and the little proof, which is a transpareut positive upon glass, is fasteued to it with Canada balsam, so as to lie in the focus of the lens. The stone is afterwards cut by a lapidary, who gives it such form as he considers suitable, and it then only remains to set it.

We have a large number of these pictures before us, and what particulary strikes those persons to whom we have shown them, is their apparent dimensions—so powerful can these simple microscopes be made. The subjects are mostly drawings and engravings. Some among them contain no less than eighteen persons (the defenders of Italy, for instance), all of whom can be recognised, their names, even, inscribed below the drawing, are perfectly legible. The carte de visite portraits can also be copied in the same manner, and M. Dagron executes a large number of copies of this kind for photographers.

M. Dagron has also modified the apparatus by means of which he obtains these microscopic pictures. A single operator can now produce several thousand specimens in a day.

Bromide of potassium is found to be a valuable substitute for opium, producing all its sedative effects without any of the objectionable qualities of the poppy.

M. Gaudin has published some interesting practical observations upon the rectification of ether and alcohol from which may be deduced a process for the extraction of these liquids in a pure state, from spoilt collodion.

The object of rectification is to deprive the ether and alcohol of the acid and water they contain, therefore they are distilled in presence of the most powerful alkalies—quick-lime, potassa and soda at their maximum dryness. Their action is ofteu incomplete, and, if they absorb the acid they do not act sufficiently as hygrometric substances: we must therefore introduce into the circuit of tubes some fused chloride of calcium. This substance wheu pure is of very high price, besides, it is capable of reacting chemically upon the liquids distilled.

M. Gaudin proposes to substitute plaster—the alcohol or ether is rectified by adding 1 per 100 of quick-lime aud 10 per 100 of baked plaster of paris; after intimate mixture, the distillation is proceeded with. The liquid to be distilled is put into a retort which for ether will remain of the surrounding temperature, or if for alcohol the retort is iumersed, in hot water and the receiver in ice or freezing mixture.

SACCHARO-SULPHATE OF IRON.

Sir,—In page 87 of your present volume, you give a formula for the composition of saccharo-sulphate of iron. Would you explain whether in that is meant anhydrous protosulphate, or crystals containing seven atoms of water. Sugar is more indefinite, for there are several sugars differing by the amount of water alone. I presume you mean eane sugar.

Though I have begun with this, it is not the main object of my communication. Photographers may save themselves the purchase of saccharo-sulphate of iron. A solutiou of 4 parts protosulphate and 1 of crystallized sugar may, I believe, be used without any acid. I have used it fresh in this hot climate with only 2½ drops glacial acid and 15 grains protosulphate per ounce; but I prefer more as with so little the persalt of iron soon ceases to be held in suspension, and the solution then requires constant filtering.

I do not believe that any person who has once given this impromptu saccharo-sulphate a trial, will ever use anything else. It never fogs with any reasonable exposure, does not flash out the picture, gives considerable density and non-actinic colour, and does not ueed to be hurried off the plate in any case. I believe most meu will think with me, this is the perfection of a developer. I may add, that I believe it has a singular power of developing shadows without destroying the lights, but this perhaps is not demonstrable. —I am, yours faithfully, J. F. Tennant, Major, R.E.

British Burmah, May 12th, 1864.

[In the formula referred to, the protosulphate of iron referred to, is that in crystals coutaining seven atoms of water. The sugar, that known as crystallized sugar candy. We are glad to hear our correspondent's favourable account of the impromptu saccharo-sulphate, as it quite agrees with our own experience.—Ed.]

PATENT SUN BLINDS.—A CAUTION.

Dear Sir,—As a matter of great importance to photographers, I beg to acquaint you with the following particulars of what appears to me an unjust demand.

During the last few years, I have tried various forms of blinds for my glass roof, and a few months since I instructed Mr. Beaumont, of this city, to make me a set to cover a portion of the roof as an experiment; at the same time I iuformed him that he must be careful not to iufringe a patent which I had heard had been taken out for a similar purpose. Mr. Beaumont's foreman inspected the patent bliuds and informed me that Mr. Beaumont was willing to make any kind of blinds I might order, there being no fear of iufringing any patent, as the blinds I wanted were but a modification of the common louvres, in which there was no patent whatever, and I went with him to a place in Manchester where he had fixed such blinds under a skylight many months previously. These bliuds were made; they are simply thin pieces of wood made to work in a manner similar to a venetian blind; and after trying them a few months, I had them taken down, in consequence of the wood warping, and they were troublesome to use. It then occurred to me, that if slight frames of wood were used, covered with tissue paper, they would answer the purpose. I had several of these frames made on my own premises, by one of my assistants, simply as an experiment; aud before I had completed them I received a letter from Mr. McLachlan, the pateutee of the blinds named above, demanding £5, which he claimed as royalty. This of course I objected to pay, and was told in reply, that the money must be paid, or the matter would be placed in a solicitor's hands. Findiug that I was not infringing any patent, I went to a geutleman who had blinds of the same kind in use, at the same time informing Mr. McLachlan that in a day or two I could convince him that I was right. In less than an hour from the time my note was sent I was served with a renewal of the demand for £5, and threatened by the solicitor that unless it was paid before twelve o'clock on the following day proceedings would be commenced. As I did uot feel disposed to ineur the risk of an action at law, I paid the money; and I now wish to caution photographers that they must be careful what means they adopt to exclude sunlight from their rooms.

The patentee claims "a method of preventing the direct rays of the sun from falling upon the sitter or other object to be copied, and of modifying or directing the light as occasion may require. This part of my inveution I divide into two portions; in the first instance, I cause strips of wood, or other suitable material, to hang downwards from the roof, at such a distauce apart, and of such a depth, as to shut out the direct rays of the sun. These strips, if desired, I hang upon centres, so that they may be inclined to any angle." Additional strips are also described.

Now my blinds were never used to keep the light from "falling on the sitter," *but just the reverse;* all the light

from the north falling on the sitter, the tissue paper being required only to shade the room at the end where the camera is used. On this point I consulted a patent agent, who informed me that it *might* be considered that my blinds infringed the patent, but at the same time, he said "the patent is bad, but I advise you to pay the money under protest, as the shortest way of settling the matter." Here, then, is the point I wish to direct attention to. Unless the £5 is paid as royalty, for use of the patent, photographers dare not use a piece of calico, paper, wood, or any other material as a blind, if suspended so as to hang downwards from the roof, without incurring the risk of an action. Is there a photographer in England who has not at some time or other required to use blinds of this description? I have heard of a case when the £5 was demanded and paid, and the infringement consisted merely of a piece or two of calico hung from the roof. This morning I have received a letter in which the writer says: "I have been using wooden frames covered with calico to shut out the sun, for two years, I never saw any used previously, it was my own joiner who made them; they are hung separately, and I do not work them by any machinery. I used the same plan in my shop window, *ten years ago*. It will be too bad if you have to pay for such a simple matter." And I have heard of another case where blinds like mine have been used four years; I shall be greatly surprised if we do not hear that others have used such blinds as long as glass roofs have been required for photographic purposes.

It will be seen I was compelled to pay the £5, before I had time to collect evidence that would have justified my resisting the demand, which I was strongly disposed to do. If, however, a fund can be collected to resist such claims, I shall be most willing to subscribe, as I do not think it fair that when the interests of a very large number are concerned, including manufacturers of blinds as well as photographers, the whole expense of a trial should fall on one person. Surely a patent was never granted on more unsubstantial grounds than this case.—Yours obediently,

A. Brothers.

Manchester. July 18th, 1864.

[As to the validity or Mr. McLachlan's patent, we cannot offer an opinion; but so far as we understand such matters the proceedings here described are altogether illegal. It is of course a matter for a lawyer to decide; but our impression is that in case of an infringement of a patent, the patentee's remedy consists in obtaining an injunction. He can make no demand for a sum assessed by himself as royalty without an agreement having been made to use his patent, in which case the sum would be a debt to be recovered in the usual way. If Mr. Brothers had infringed the patent a specific remedy existed, but a demand for £5, as described, appears to us to have been altogether illegal and irregular. This is, of course, but a lay opinion, and we are open to correction. The validity of a patent can only be certainly decided by litigation.—Ed.]

Photographic Notes and Queries.

Prize for Portraiture.

Sir,—I think the committee who awarded the two prizes for portraiture, at the Photographic Exhibition, should explain to the photographic world on what principle they have placed Mr. T. R. Williams's name *second* on the list.

I should be sorry to disparage the merit of the gentleman who obtained the first prize; but I am sure that there will be only one feeling prevalent in the photographic profession; and that is, that Mr. Williams's name ought *not* to be second. Were I that gentleman, I would decline such a second rate compliment. Yours truly, ?.

July 17, 1864.

[The fact of Mr. Williams's name following that of Mr. Joubert is, we believe, simply an accidental circumstance and is not intended to imply any secondary position. Both the medals for portraiture are of equal value, and are intended to express equal merit in different kinds of portraiture.—Ed.]

Talk in the Studio.

The Hot Weather and Photography.—We have received many intimations, during the last week, of the photographic difficulties which have arisen from the extreme heat of the weather. Pinholes, fog, red deposit on the shadows, want of intensity, &c., appear to be prevalent. Mr. Warner, of Ross, asks us to inform photographers generally, and especially those who are expecting enlargements from him, that, owing to the heat, it is almost impossible to get any vigour in enlarged negatives, and that for good work he must wait for good weather. Photographers in their general work must bear in mind that heat increases chemical action. Let them keep their nitrate baths cool, the developer weak and acid, and keep the studio and dark room as cool as possible by means of ventilation.

The Photographic Exhibition.—Those of our readers who have not visited the Photographic Exhibition, should lose no time in doing so, as it is intended to close it at the end of this month.

The Award of Medals in the Exhibition.—We have been requested to publish the following:—"Lieut-Col. Stuart Wortley begs that the following words may be appended to the award of the medal for an impression from stone or metal:—'Lieut.-Col. Stuart Wortley dissents from the award of the medal for the best impression from stone or metal to Mr. Toovey.'" We also notice, in the *Journal of the Society*, that Col. Stuart Wortley and Mr. Durham express their protest against the award of the medal for landscapes to Major Gresley. It will be seen from these circumstances that the merit in various classes has been very finely balanced, and, moreover, that the adjudication has been conducted by the gentlemen entrusted with the duty, without any compromise, each adhering to his own judgment as to the merit of the various specimens.

Photographic Ghosts.—Mr. Walter Woodbury, of Manchester, sends us the following description of an interesting experiment:—"If we take a negative (the larger the better) and place it in a window with a piece of ground glass behind, and darken all the other panes but the one on which the negative is placed, and then look steadily at one particular part of it for, say, half a minute; on directing the eyes to the dimly illuminated ceiling of the room we see there depicted a beautifully distinct positive of a rich sepia tint. The illusion is really astonishing, and forms a striking illustration of the persistency of vision. If this is shown to a person who is acquainted with the subject of the negative, he will not recognize his friend on looking at it, but on looking at the ceiling will have a perfect ghost of the person there presented to his vision. If the eyes are not kept on the same spot, a blurred vision will be the result. By looking closely at the negative, a large figure will appear, and *vice versâ*. By the aid of a magic lantern, this might be well shown to a large number of people."

Berlin Photographic Society.—At the last meeting of this society, Mr. Osborne was made an honorary member, as expressive of his merits as a photographer, and of his labours in aiding to establish the society by his preliminary effort, and subsequent reading of papers. Professor Poggendorff sat, at the same meeting, for a portrait taken by means of the new magnesium light, which was very successful, being soft, delicate, and round.

Photographic Patents in America.—Our transatlantic friends are prolific in patents, and photography appears to contribute its full quota to the records of the Patent Office, at Washington. From the *Scientific American*, we ascertain that three photographic patents have been obtained within the last few weeks. One is for a new apparatus for gumming, cutting, and mounting photographic prints; another for an apparatus which appears to be an automatic field camera; and the third for a new rolling press. The abstracts of specifications given are too brief to afford much idea of the nature or working of the respective inventions.

To Correspondents.

TRUTH.—We cannot suggest any certain method of securing the return of specimens when sent out by operators, but if the advice we have before given be adopted, we think it would tend to secure such return. Let the operator write his name across every specimen, so as to render it useless to any one else; this will remove the temptation from dishonest persons, should there be any such connected with photography, and it will aid the memory of careless persons. Also send an addressed envelope, in which they may be returned. This will, sometimes, secure an immediate return; when, if an envelope needed to be addressed, it would often be put off from day to day. 2. If you send us an example of the defective lighting, we can aid you better than it is possible to do from a description. 3. Any iodide may be used for iodizing the bath.

TYRO.—After iodizing your bath, by leaving a plate in it for some hours, you state that the solution was coloured. What was the colour? Unless it had come into contact with something which it ought not to have touched, there should not be a change of colour. Your best plan will be to neutralize it with carbonate of soda, sun it well, filter, and then dry it, adding a little acid, if necessary. 2. If you have added more water than the formula directs, you have made the paste less adhesive. Gum tragacanth never makes a very tenaciously adhesive paste, but sufficiently so for card pictures, if it be properly made. 3. As a rule, with chemicals in good condition and a well-lighted subject properly exposed, the high lights will appear in a few seconds after applying the developer, and the image will be well out in about a minute. But the time will vary with the temperature, the strength of the developer, the proportion of acid in it, the kind of collodion, &c.

PROTOSULPHATE OF IRON.—A correspondent, whose letter is mislaid, sends us a sample of protosulphate of iron, and asks if it is pure, or would cause his negatives to fog? It is pure enough for his purpose, the brown edges caused by some portion having been exposed to the atmosphere and passed into a persulphate would weaken the developer made with it, as the brown particles would have no developing action at all.

S. P. S.—Mr. Aldis's recipe appeared on p. 395 of our 7th volume, No. 258 The mixture consists of raw sienna and orange chrome mixed to a proper consistency with turpentine, Japanner's gold, size, and patent driers.

COSMOS.—We fear that silver stains in black cloth are irremediable, as the process of removing them does not leave the cloth uninjured. As something depends on the nature of the dye used in the cloth, you may at least make the trial. First treat the stain with tincture of iodine, and then follow with cyanide of potassium.

A. M. N.—Dr. Hill Norris recommends that his plates should be developed as soon after exposure as can be conveniently managed; but we should think, if they are kept carefully preserved from the chance of atmospheric action, moisture, &c., as well as from light, they might be developed two or three weeks afterwards.

A BRIGHTON DABBLER.—It is absolutely necessary, in order to arrive at anything like a definite estimate of the relative exposure required by two lenses, that we should know the equivalent focus of each. From your description of the two lenses, we can only give you a probable approximation; if we are correct in our estimate of the two lenses and the proposed stops, the lens you possess is worked with an aperture of about one-sixth of its focal length, and the other you mention would, with the stop mentioned, have an aperture of one-fourth of its focal length; the exposure will in such case, other things being equal, be a little less than half.

A STUDENT OF THE PHOTOGRAPHIC NEWS.—If we understand your description correctly, you place your sitter facing the south, which is decidedly an error. The best mode of dealing with your room, when the western sun streams into the room, is to cover up the western windows entirely with blinds, and work with the light from the east. It is, as you remark, a difficult thing to learn the art of lighting from reading alone. A single practical lesson from a good practical man is often of great value, but we cannot tell you how to acquire that without coming to London.

TYNDALL.—The placing of a small stop in contact with the outer surface of your back lens is a very foolish plan. There are two or three ways in which you may meet your difficulty. You may use stops of blackened paper in contact with the front surface of your front lens, or you may place a blackened card-board stop between the lenses, about one-third of the whole distance behind the front lens; or you may get the maker to furnish the lens with a set of diaphragms, the latter being the best plan. 2. Softness is the result of a combination of causes. The subject should be properly lighted to begin with: the chemicals appear all right enough, as you describe them; and you state that you give sufficient exposure. This is an all-important point in getting softness. But it is probable that you over-intensify. The use of mercury, except in the hands of those who are perfect masters of the process, often leads to hardness. 3. Regarding your glass room, the plan you adopt to get rid of reflections from the windows opposite your studio, will, doubtless, cut off a very large amount of light. If you could cover the windows outside with a dark blind, you would get rid, to a large extent, of the annoying reflections, without losing light.

LIEUT. SENIOR.—We will make inquiry at the Photographic Association, and, if necessary, propose you again. We should think the views would be interesting, and, probably, saleable. There was no print enclosed in your letter. We have inserted your letter containing valuable suggestions.

NIL DESPERANDUM.—We meant that one side might generally be used without blinds, except the low part referred to, but that a great portion of the other side would need to be kept covered with blinds, in order to secure a shadowed side of the face. You understand us correctly about the low portion being kept covered with blinds. The object is to concentrate the light, and avoid a number of small sources of light. You understand us aright as to top blinds. Unless you find it necessary, we should not recommend permanently obscuring any portion of the glass. Use blinds which can be closed and opened at pleasure, as the state of the light and the general necessities of the case demand. The blurred image appears to be rather due to the sitter being out of focus than to moving. Is your camera quite true, and does the dark slide fit it perfectly? There is in several of the cards sent some want of definition, which may be due to an imperfect lens, or may be due to some want of truth in the camera or dark slide. Many of the specimens are characterized by great artistic feeling, and possess considerable merit. We are much interested in your last letter, and sympathize heartily with your aspirations.

TAADUTUS.—Excess of alcohol in a developer will produce various irregularities; it will often make the developer turbid and cause spots, and it will make it flow irregularly, producing the very defect it is usually intended to cure. 2. The argentometer sold to ascertain the strength of silver solutions by specific gravity is, of course, graduated for silver solutions. Any instrument of this kind must be graduated for the especial fluid the strength of which it is desired to test.

L.—Thanks for the hint. We shall, probably, give it to our readers.

Several correspondents in our next.

Photographs Registered during the Past Week.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of Dr. Lightfoot.
Photograph of Rev. James C. Street.
Photograph of Eldon Square, Newcastle.

MR. THOMAS WORDEN, 41, Grainger Street, Newcastle-on-Tyne,
Photograph of Pilgrim Street, Newcastle, from S.
Photograph of Mosley Street, Newcastle, from E.
Photograph of Royal Arcade, Newcastle, from W.
Photograph of Collingwood Street, Newcastle, from W.
Photograph of Newgate Street, Newcastle, from N.W.
Photograph of Clayton Street East, Newcastle, from W.
Photograph of Blackett Street, Newcastle, from E.
Photograph of Market Street, Newcastle, from E.
Photograph of Gay Street, Newcastle, from N.
Photograph of New Market, Newcastle (Interior) from S.

MESSRS. HENRY AND JONAS WALTER, Broad Street, Lyme Regis, Dorset,
Photograph of Francis Kuper Dumas, Esq.
Photograph of Vice-Admiral James Burney.

Mr. J. MAROETTS, 12, Prospect Place, Kingsland, N.E.,
Three Photographs of Rev. Wm. Stafford Finch.
MESSRS. CRAMB BROTHERS, 67, West Nile Street, Glasgow,
Photograph of Rev. A. N. Somerville, Glasgow.

MR. WM. FREDERICK TAYLOR, 13, High Street, Windsor,
Photograph—Full View of the East Terrace, Windsor Castle.

MR. SAMUEL JAMES WISEMAN, 15, Above Bar, Southampton,
Photograph of H.M. Ship "Irresistible."

MESSRS. HELSBY AND CO., Liverpool,
Photograph of Miss Wallace, of the Strand Company.

MESSRS. MOIRA AND HAIGH, 1, Lower Seymour Street, Portman Square,
Photograph of John Spurgin, M.D., F.R.C.P.
Photograph of Dr. P. M. Roget, F.R.C.P.
Photograph of Dr. Protheroe Smith, M.D.
Photograph of Cæsar Hawkins, F.R.C.S., F.R.S.
Photograph of Dr. Joseph Ridge, M.D., F.R.C.P.
Photograph of Dr. Richard H. Goolden, M.D., F.R.C.P.
Photograph of Dr. C. Murchison, M.D., F.R.C.P.
Photograph of Dr. Ed. Smith, M.D., F.R.C.P.
Photograph of Lord de Tabley.
Photograph of Cæsar Hawkins, F.R.C.P., F.R.S.
Photograph of Dr. Black, F.R.C.P.
Photograph of Sir Henry Cooper, M.D., F.R.C.P.
Photograph of Dr. F. W. Headlam, M.D., F.R.C.P.
Photograph of His Grace the Archbishop of York.
Photograph of Thomas Tatum, F.R.C.S.
Photograph of John C. Wordsworth, F.R.C.S.
Photograph of Dr. R. P Cotton, M.D., F.R.C.P.
Photograph of Dr. C. J. B. Aldis, M.D., F.R.C.P.
Photograph of General Wylde.
Photograph of Major Teesdale.
Photograph of Dr. W. E. Page, M.D., F.R.C.P.
Photograph of Dr. Munk, F.R.C.P.
Photograph of Dr. John Webster, F.R.C.P.
Photograph of Dr. S. O. Habershon, M.D., F.R.C.P.
Photograph of Dr. James Risdon Bennett, M.D., F.R.C.P.
Photograph of Dr. Weber, M.D., F.R.C.P.
Photograph of Dr. John Burdon Sanderson, M.D., F.R.C.P.
Photograph of Dr. W. E. Page, M.D., F.R.C.P.
Photograph of Henry Thompson, F.R.C.S.

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LETTERS TO BE CALLED FOR.—A correspondent asks us to call the attention of advertisers to the post-office regulation which decides that letters, merely addressed with initials, to be left at some post-office until called for, will not be delivered.

THE PHOTOGRAPHIC NEWS.

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NEW CARBON PROCESSES.

THE present year will be famous in the annals of photography as having been prolific in new or modified carbon processes. The publication of the details of Mr. Swan's method has not only stimulated new votaries to enter upon this especial branch of the art, but has induced old experimentalists to revive their old studies, examine their old memoranda, and call up their old experience to be reconsidered in a new light. At a recent meeting of the Edinburgh Society, Mr W. H. Davies, who, it appears, is an old experimentalist in this direction, described a process arising out of the renewed impetus recently communicated to this branch of the art. Neglected studies again received attention, old operations were seen to possess new capabilities, and a process is described, the results of which, from the comments of some of the gentlemen present at the meeting, possess much merit.

Mr. Davies's early experiments, as we learn from his paper published in the *British Journal*, were chiefly directed to the production of photolithographic transfers, and his aim was to obtain some saponaceous compound whereby printing ink could be combined with bichromated gelatine. In the paper in question, he says :—

"My experiments were wholly or mainly directed to perfecting a photolithographic process, which should give half-tone as rendered in the photograph direct from the printing press; and, the transfer process being familiar to me, I tried to produce my photograph in a greasy or soapy ink which should be capable of such a transfer, and from which prints direct from the stone could be taken.

"No two substances are more disinclined to union than a watery solution of gelatine and an oily mixture of carbon, or printing ink; yet I could work with no other, and my efforts were directed to getting a 'go-between,' which should soften the asperities of both, and combine them in one happy mixture. This, I found, could be effected by making a saponaceous compound of stearine and carbonate of soda in the proportions, roughly, of three of stearine to four of soda, with sufficient water to form a fluid. These are boiled in a pipkin for half-an-hour, and allowed to set, when it is ready for use. I now take equal parts, or thereabouts, by bulk of this soap and of transfer or printers' ink (by preference the former), and thoroughly incorporate them on the grinding slab till they become homogeneous. This is mixed with the bichromated gelatine, and, if for a lithographic transfer, the gelatine to be kept as weak and small in quantity as it will work, and the ink as full as possible, in order that the saponaceous mixture may bite the stone."

The experiences obtained in working in this direction induced him to think of employing paper as a basis for the pigmented gelatine and bichromate, instead of using Mr. Swan's tissue. He then proceeds to describe a process very similar to that described by Mr. Cooper in our pages. It appears that Mr. Davies had worked out this process some time earlier, but to Mr. Wild belongs the credit of the first publication (see PHOTOGRAPHIC NEWS, p. 305 of the present volume), although it was specified by Mr. Swan earlier than this. The manipulations of Mr. Davies are in many respects identical with those given by Mr. Cooper, with the exception that he adds the bichromate at the time of preparing the paper, instead of exciting it by floating afterwards. It is stated that either water colours or those mixed with oil, as described, may be used; but it is an omission to be regretted that nothing is said of the colours which give the best result.

We have now to announce another modified carbon process, somewhat analogous in some respects to that of Mr. Davies. Those of our readers who were present at the April meeting of the London Photographic Society, when Mr. Swan's paper was read, will remember that the secretary called attention to a very good carbon print by Mr. Firling, of Dorchester, stated to have been produced with but a few minutes' exposure. Shortly after that, Mr. Firling favoured us with a call, and showed us some other specimens, resembling in character Mr. Pouncy's prints, but produced with exposures considerably shorter than those of the latter gentleman. The process, as he then explained it, and as we are now at liberty to publish it, is a very simple one, resembling Mr. Pouncy's in many of the manipulations, and having an analogy with Mr. Davies's in the use of a saponaceous body. It consisted simply in grinding brunswick black with common soft soap, until it attained a consistency suitable for applying to a thin and transparent paper like Mr. Pouncy's. This paper was then to be exposed from the back, and developed with turpentine.

Mr. Firling is an amateur photographer with but little time for experiment, and none for theorising; he was led from an observation of Mr. Pouncy's process to try various of the bodies he used in his own trade, that of a painter, and found that the mixture in question gave him prints possessing half-tone, with a very brief exposure. The material sensitive to the action of light is, doubtless, the brunswick black, which is, we believe, a preparation of asphaltum; but we are assured that it requires much less exposure when combined with a saponaceous body than when mixed with a fatty body; and it is probable that the addition of a chromic salt would render it still more sensitive.

We may here make a remark on Mr. Davies's explanation of his original object. His aim was, he states, to get an image in half-tone transferred to a lithographic stone. Experimentalists in this direction should remember that even if a perfect image in half-tone be transferred to stone, something considerably more than this will be necessary before they can hope to get an image possessing half-tone printed from the stone. So long as the lithographic stone possesses but one degree of affinity for greasy ink, so long will the

most delicate tint of half-tone communicate to the stone a power to yield from that delicate tint a black as deep as that of the darkest shadows. The half-tone in the transfer simply consists of a thinner layer of ink than is found in the deepest shadows, but the stone makes no such discrimination, the delicate layer, and the thick layer of iuk, communicate to the stone an equal affinity for ink, and the resulting prints will show little, if any, difference between the most delicate and the blackest tint. Gradation must be obtained either by the size of dots and lines, aud the spaces between them, or by communicating, it possible, varying degrees of affinity for ink to the stone, so that, in printing, more ink may adhere to the stone and be communicated to the print in the deep shadows than in the various delicate tints which constitute half-tone.

Scientific Gossip.

The Laws of the Distribution of the Fixed Lines in the Spectrum—Dimensions of the Atoms—the Element of the Elements.

Whoever has examined the multitude of brilliant lines given by the metallic elements, when ignited before the aperture of the spectroscope, cannot fail to be impressed with the idea that, hidden in the apparent disorder with which they are scattered over the field of the instrument, and overruling the chance which appears to have placed them in position there, is hidden some grand law—a law which, when once understood, will give us as great an insight into the atomic constitution of the elements as Dalton's researches have into their atomic weights. Attempts have been repeatedly made to get a little deeper into the mysteries of the distributions of the fixed lines, and not a few have been under the impression, that by expressing well known facts in intricate language, they had succeeded in giving a clear explanation. The spectra have been mapped out with an accuracy and degree of minuteness which would have been thought incredible some years ago; and further, we hear that whilst Kirchhoff has been obliged to desist from his labours, on account of the injury which they did to his eyesight, other experimentalists are preparing maps of the solar and artificial spectra, which are to leave Kirchhoff's quite in the background. But without a law, or a good hypothesis to stand in the place of a law, all these facts which are being accumulated are of little value. They are like pearls lying loose in a jeweller's tray, whilst the undiscovered law is the silken thread which is to string them together. One of the best attempts to penetrate this mystery has lately been published by Professor Hinrichs in the last number of *Silliman's Journal*. Impressed with the conviction that the bright lines of the elements would prove to be distributed according to simple laws, and that these laws might lead to a knowledge of the relative dimensions of the atoms. He has commenced the investigations with the group of alkaline earths and iron.

Although Kirchhoff's measurements, which he has taken as the foundation, are not to be considered as final, and the investigation can therefore only be considered as a preliminary one, several of the results are most interesting and important. The professor commences with the calcium spectrum, and endeavours to ascertain whether the different groups of lines exhibit any order. Space will not admit of our entering into the details of the separate examinations, but the results which he obtains with each of the six groups which compose this spectrum, justify him in announcing the first law, *that the mutual distances of the different lines in each separate group are multiples of the smallest distance in such group.* The second law, based upon an examination of the six groups of the calcium spectrum, is the result of some remarkable physical combinations, and is stated as follows:—*The intervals in the different groups may be expressed in very simple numbers, as* 1, 2, 3.

The 3rd law, is, that *the difference in wave-length between the corresponding lines in a group is the same throughout the whole spectrum.* It will be borne in mind that these groups were not selected to lead to such a law, but that the physical groups were taken as selected in the previous instances. The 4th law, is, *that the principal corresponding lines, or groups of lines, are equi-distant in regard to their wave-lengths.* It will be perceived that these successive laws may be considered as generalizations of the same principle. Hence it is of the utmost importance to see how far other substances give evidence of the same laws. The barium and magnesium spectra were accordingly submitted to the same searching examination, with the important result, that the four laws first found for the calcium spectrum are true for all the members of the group of alkaline earth, as far as their spectra are known.

From this it may be concluded that they are essentially correct for all elements. How far this generalization is warranted, Professor Hinrichs has tested by one of the most remarkable spectra; the brilliant and rich spectrum of *iron*, especially the three great groups of lines in this spectrum—groups almost without parallel, both in regard to range, intensity, and closeness of the lines. The examination, which is given at length in the paper above referred to, of these most magnificent groups of the iron spectra, fully confirms the four laws deduced from the calcium spectrum, and extended to the alkaline earths. Hence we may conclude that those laws in substance will be found applicable to all elementary spectra. But until much more rich and accurate measurements, combined with direct determinations of wave-length have been made, a further prosecution of this investigation will be useless. The professor, therefore, contents himself with this preliminary research, in the anticipation that future investigations, based upon richer material, will extend these laws, and by dividing the larger intervals will prove that these remarkable lines are not distributed at random, but are as regular as the stripes diffused by diffraction.

As far as the observations extend at present, the above four laws seem to point to the following one, which includes them all. The dark lines of any element are regularly distributed over all the spectrum in equi-distant groups consisting of equi-distant lines; but the intensity of these lines regularly increases and diminishes so as to obliterate a number of lines, and even of groups, thus producing gaps in the regular series—gaps which can only be completed by increased optical powers and more intense light. If Professor Hinrichs continues, he has succeeded in making the regularity of the apparently highly irregular lines probable—for they certainly show definite and simple laws in their distribution—it may naturally be asked what causes this distribution, and what will probably be the reward of continued researches in this direction. The lines can only have one of the two following sources; they are either produced by the dimensions of the solid particles, or by their distances apart. The latter is impossible, for these lines remain absolutely the same under such different circumstances as cannot but, to some extent, change the mutual distance of the particles. Hence the lines must be produced by the bulk of the atoms themselves, and an exact knowledge of these laws and distances must lead us to a knowledge of the relative dimensions of the atoms, both as to length, breadth, and thickness; thus optics will give us the form and size as chemistry has given the weight of the atoms. The remarkable result which the Professor has obtained by comparing the distance between the calcium groups (4·8), and the barium (4·4), seems to show that one dimension of the atoms of these two elements is nearly or—if the above values should be found to be exactly equal—perfectly identical.

We need not point out how great is the interest of such determinations in regard to the constitution of the elementary bodies; it may yet lead to an experimental demonstration of the existence of a primitive substance, *the element of the*

elements. How the dimensions of the atoms produce these lines is another question, and it is very difficult even to suggest any probable connecting link between the dimension of the atoms and the luminous wave.

It is, we think, somewhat unfortunate that Professor Hinrichs has taken for his basis the highly complicated and slightly imperfect spectra of calcium and barium, as given by Kirchhoff, instead of basing his researches upon observations of his own. There are artificial spectra which possess remarkable regularity throughout their entire length, and had one of these been selected to furnish data for the examination we have little doubt that the task to which Professor Hinrichs has applied himself so assiduously would have been considerably simplified.

We may especially mention the elements selenium and tellurium, as exhibiting spectra consisting of alternate light and dark bands distributed in equi-distant groups, almost throughout the entire length. The spectrum of boron is another one which shows an evident law in the distribution of its lines, and we think that either of these would have been preferable for the purposes of investigation than the complicated spectra which were selected.

RESEARCHES ON POSITIVE PRINTING.*

BY MM. DAVANNE AND GIRARD.

Treatment of Solid Residues.

It now only remains to speak of solid residues. All the waste papers of the operating room must be collected together, burnt in a clean furnace, and the ashes left in a heap to smoulder, in order to render the combustion of the organic matters complete.

Some authors have recommended the treating of these ashes by nitric acid. This method is bad, and must not be attempted, for among the mineral salts these papers leave by incineration figure chlorides and sulphides, which convert a part of the silver into chloride and sulphide of silver, irreducible by charcoal. We have proved this by direct experiment. Fifty grammes of ashes treated by nitric acid, washed, dried, then melted under suitable conditions, have yielded a button of silver weighing ten grammes.

The ashes must, therefore, be treated by the dry method; the operation is performed in a crucible in the manner before explained, only the substances mixed with them are different, for in this case there is, in fact, no oxidation to be effected, but the lime the ashes contain in large quantity must be converted into fusible glass.

We make the following mixture:—

Ashes	...	...	...	100 parts
Carbonate of soda, dry	...	...	50	„
Quartz sand	...	...	25	„

Thus mixed, the materials melt readily, even the chloride itself is reduced, and we may obtain a metallic button, the weight of which will vary from 30 to 60 per 100 of the weight of the ashes, according to the nature of the papers submitted to combustion.

In conclusion, by following the method we have indicated, and applying it carefully, the photographer may always find in his residues 90 per 100 of the silver employed. In fact, the only loss or expense that he will have to incur, are:—

3·1 per 100 (about) remaining in the proof.

2·3 per 100 lost in draining.

3·7 per 100 (about) which the plates of copper will not have completely removed from the hyposulphite solutions.

The reader will doubtless be surprised that we have not, in the course of this inquiry, spoken of the gold residues; but if he will refer to the chapter on Toning, he will recognize that with the gold bath acting in a continuous manner, as we have proposed, gold residues no longer exist. If, however, the photographer attached to the old methods of toning believes that he ought to throw among the residues every day the considerable quantity of gold still remaining in an inert bath, and which can be turned to account, he will not trouble himself about the matter. What we have stated about the silver applies also to gold. The plates of copper and zinc precipitate gold as well as silver, and both will be found in the powder precipitated, or in the metallic button.

* * * * * * *

In concluding this lengthy study upon positive proofs, we cannot help turning our glance backwards, and from the starting point throwing a *coup d'œil* upon all the facts contained in it. Upon publishing, on the 19th February, 1858, the first lines of this inquiry, which had already occupied our attention for three previous years, we wrote:—

"Hitherto inexplicable, photographic phenomena must necessarily enter into the series of ordinary chemical reactions." We can now say unhesitatingly that all our anticipations are realized.

The decomposition of chloride of silver under the influence of light, the nature of the substances which colour the proof, the part which free nitrate of silver, the salts of gold, and especially the organic matters employed by the photographer in sizing his papers—play in the production of this colouring—together with the effect produced by different fixing agents, and especially by hyposulphite of soda, the limits of their action, the very curious and interesting operation of toning being now explained by the simple exercise of chemical forces—are nothing but phenomena similar to those which the chemist effects every day in his laboratory.

It is not theory alone that has profited by these researches, practice has equally benefited by them. The study of the influence which different kinds of paper and their sizing exercises upon the beauty of the proof; the demonstration of the fact that the various chlorides recommended for *salting* act in a manner identically the same, the determination of the effects due to the state of concentration, of acidity, or of neutrality in the sensitizing bath, the demonstration of the destructive action of the old hyposulphites, the establishment of the practical conditions of fixing and toning, and above all, the invention of processes permitting of the obtaining a perfect stability in photographic proofs—will remain as the principal results of the inquiry we have laboriously pursued during the past ten years.—*Bulletin de la Société Française de la Photographie.*

* Concluded from p. 345.

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

(Continued from p. 356.)

c. *Experiments with Iodide of Silver.*

As already observed, the influence of acids upon the changes which the haloid salts of silver undergo by exposure to the sun's light is most strikingly manifested in the case of $Ag\ I^{\beta}$. I filled five tubes with $Ag\ I^{\beta}$, poured over the salt nitric acid of sp. gr. 1·2, dilute sulphuric acid (one part water, five parts SO^3), acetic acid, citric acid, and water, and exposed them simultaneously to the light. Within a few minutes, differences in the colouration of the samples were clearly perceptible. The portion under water appeared of a rather deeper grey than that under the dilute acid, but that with nitric acid appeared of a pure yellow colour.

In the course of an hour the difference became still more strongly marked; the iodide under nitric acid was still pure yellow, that under sulphuric acid appeared somewhat grey, the samples with acetic and citric acids were of a deeper

* From *Poggendorff's Annalen.*

grey, and that under water was the darkest. After exposure for days, the portion under nitric acid also acquired a grey colouration—a phenomenon which will find an explanation hereafter.

I have stated above that bromide of silver coloured by light is slightly bleached by nitric acid; this is the case in a far higher degree with the iodide. If nitric acid be poured over iodide of silver which has become grey, it re-acquires its original pale colour in a few minutes. In this case no solution of silver takes place (although a little silver is dissolved by long standing, iodide of silver being decomposed in course of time by nitric acid). Dilute sulphuric acid likewise manifests this bleaching action, though only to a small extent.

Whilst nitric acid is thus capable of considerably opposing the action of light, iodide of potassium entirely suppresses it. Schnauss found that an excess of KI rendered iodide of silver indifferent to the action of light ("Photogr. Lexikon," p. 179); and this result has been confirmed by Monckhoven and Hardwich (*Photogr. Archiv*, 1863, p. 17). In order to repeat these researches, I poured iodide of potassium over $Ag\,I^{\beta}$: the latter immediately became pale yellow, and then did not undergo the least change by exposure to light. I also poured solution of iodide of potassium upon $Ag\,I^{\beta}$ which had become grey by exposure to light, when it immediately acquired a light yellow colour.

During the exposure of iodide of silver covered with solution of iodide of potassium, I noticed the elimination of iodine. At first I ascribed this to a decomposition of the iodide of silver, but soon found that it was due to a decomposition of the iodide of potassium. In order to prove this decomposition, I filled six tubes with a solution of one part of iodide of potassium in six parts of water, boiled them to expel the air, and closed them with plugs of wax. Three of these tubes were covered with an opaque coating, and the others left uncovered; the whole were then laid in the sun. In a few hours the exposed samples had acquired a distinct yellow colour; the covered portions remained colourless. The yellow colour gradually increased with the lapse of time.

I now compared the behaviour of the solution of pure iodide of potassium with that of a solution of iodide of silver in iodide of potassium. Both acquired a yellow colour by exposure to light; but this took place more rapidly with the pure solution than with that containing iodide of silver. Dry, solid iodide of potassium is not decomposed by light.

Iodized paper also is changed by exposure to light. I soaked paper in solution of iodide of potassium, and dried it; on exposure, it immediately became reddish, and was then rendered blue by thin starch paste. By exposing iodized paper under a negative I obtained a yellow picture upon a white ground; it was rendered blue by starch paste.

As there are certain acids and salts which can either prevent or retard the colouration undergone by chloride, bromide, and iodide of silver when exposed to light, so there are others which, on the contrary, most decidedly favour this reaction; amongst these is nitrate of silver.

3. *Influence of Nitrate of Silver.*

I exposed to the light two glasses, one with chloride of silver and water, the other with chloride of silver and a silver solution (one part Ag O, NO^5, to ten parts water). Both acquired a violet colour. In the course of an hour, however, the chloride under the silver solution appeared somewhat darker in colour than that in water; and the difference became still more distinct by longer exposure.

The favourable influence of nitrate of silver upon bromide of silver is still more striking. If the bromide be exposed to the light with water and nitrate of silver simultaneously, the considerably more intense colouration of the bromide under the silver solution is observed within a few minutes. Even in diffused light this phenomenon is striking. In direct sunlight the bromide of silver with the nitrate becomes deep blackish grey, with a shade of violet.

Iodide of silver, like the bromide, acquires a much more intense colour when in contact with nitrate of silver than without it. If two portions of iodide of silver, one with water, the other with nitrate of silver, be exposed together to the light, the latter becomes deep grey, with a greenish tinge, within a few minutes, whilst the former only becomes pale grey. The deeper colouration of the iodide occurred also with dilute solution of nitrate of silver. I took four portions of iodide of silver, and poured over three of them solutions of nitrate of silver, of the strengths I : 20, I : 40, and I : 100; the fourth received only water. The samples, when exposed, became coloured more deeply in proportion to the concentration of the solution; but all were darker than the sample in water. The difference between those with nitrate of silver was not, however, very considerable, and only made its appearance more distinctly after the lapse of some days. If bromide and iodide of silver, both with nitrate of silver, be exposed to the light, the bromide is seen to become coloured much more intensely than the iodide.

For the elucidation of these phenomena, I examined into the behaviour of nitrate of silver by itself in the light. I exposed, simultaneously, three glasses with silver solution, of which one contained 10, another 5, and the third 2½ per cent. of nitrate of silver. After exposure for some hours to the light of the sun, all the glasses showed a small quantity of black points, which did not increase by longer exposure; these became white and silvery when pressed with a glass rod; and when the silver solution was removed by decantation and washing, they dissolved completely in nitric acid. This solution became turbid with hydrochloric acid. Solution of nitrate of silver is, therefore, decomposed in the light, with separation of silver. Schnauss,* Hardwich,† and others assert that solution of nitrate of silver is not decomposed by light unless organic substances be present. I have, however, frequently repeated the above experiments with pure fluids and clean glasses, and always detected a separation of black granules of silver.

On the other hand, solid nitrate of silver, if pure, remains unaltered by the light, as has already been observed by Scaulan (*Poggendorff's Annalen*, xlvi. p. 632). I consider that the decomposition of nitrate of silver is not a direct one. Supported by the fact, discovered by me, that carbonate and oxide of silver, when exposed to the light, are reduced to protoxide, which is decomposed by acids into silver and oxide of silver, I believe that Ag O, NO^5 is likewise first reduced to protoxide, but that the nitric acid thus set free exerts a decomposing action upon the latter, and thus produces metallic silver.

The decomposition of nitrate of silver thus produced by light is, however, too inconsiderable (the silver granules can frequently be detected only by the lens) to explain the intense colouration which is undergone by iodide and bromide of silver when exposed to the sunlight under a silver solution. But I have ascertained that silver is actually separated during the exposure of bromide of silver covered with solution of nitrate of silver, by thoroughly and carefully washing the bromide of silver until the washing water no longer gave a reaction of silver, and then boiling the salt with nitric acid; the entire mass became paler, and the nitric acid gave a distinct silver reaction.

The bromide left after boiling with nitric acid had, however, a much darker appearance than pure bromide exposed for an equal time—proving that, during exposure under nitrate of silver, not only is silver set free from the latter, but the reduction of the bromide of silver is decidedly assisted, and that the darker colouration results from this double action.

With chloride of silver, also, when exposed under nitrate

* *Photographisches Nachschlagebuch*, p. 303.

† *Manual of Photographic Chemistry*, p. 18.

of silver, a separation of silver takes place, as I ascertained in the same way.

In the case of iodide of silver, the free silver cannot be detected by boiling with nitric acid, as the iodine itself is decomposed thereby; but from analogy with the bromide and chloride, it is very probable that the same decomposition takes place here, and I even succeeded in detecting the silver in a portion of iodide exposed for several days with a solution containing 5 per cent. of nitrate of silver, by pouring over it a solution of hyposulphite of soda, and thus dissolving the iodide of silver. There remained a very small quantity of greyish-black granules, which, after long washing and decantation, dissolved in nitric acid, and gave a silver reaction with hydrochloric acid. With reference to the behaviour of iodide of silver towards nitrate of silver and nitric acid, its final acquisition of a grey tint under nitric acid cannot surprise us. The acid in time decomposes a portion of the iodide, and the grey colouration is produced in contact with the nitrate of silver thus formed. The intense colouration undergone by iodide of silver under nitrate of silver has induced Schnauss to assume the existence of a particularly sensitive compound of Ag I + Ag O,NO^5. He found that from a boiling solution of iodide of silver in the most concentrated solution of nitrate of silver silky crystals are deposited, and that these are very rapidly blackened by exposure to light, and consist of Ag I + Ag O,NO^5 (*Archiv der Pharm.* cxxxii. p. 260).

(To be continued.)

DATE YOUR PHOTOGRAPHS.

Everybody, writes a friend at the West, has his picture taken; and since the photograph is so cheap and universal, everybody will always continue to have it taken. If the invention had been earlier, "every old house, museum, palace, castle, and cottage would be full of old likenesses; and among them would be the photograph of Luther when he left his father's house for the University, and one at Worms, later in life; one of Shakspeare, given to Miss Hathaway during their engagement; one of Bonaparte when at the military school; one of Washington when he returned from his western survey; there would be one of Abraham Lincoln taken at a Mississippi village, where his flat-boat was detained a day. But could we identify these pictures? *Not one in a thousand would have on it the name and the date.*

This is the pregnant text upon which our friend is sure that the Easy Chair could preach two or three columns. But it preaches itself. It is so obvious a duty that we should hope it needed no enforcing, although we know very well that it is a duty often, and perhaps generally, left undone. We say that it needs no enforcing, because, when fully stated, no argument or appeal can strengthen it. If you, good reader, when you next have a card taken, which you privately think is a caricature of your face, will write your name and date upon it, you will really increase its value. And to enlarge the exhortation, please also date exactly all your notes and letters. It is not enough to write Thursday, or June 20th, at the top or bottom. That kind of date has no meaning next year or the year after, and it costs very little trouble to put the figures of the year. The whole subject, brethren, falls under the general head of method and order. A very little care would convert a slattern into a neat Phillis, and a shuffling, shambling, confused, and lazy conduct into a prompt and effective one. A place for everything and everything in its place, is one of the earliest copies upon which we all exercise our powers in pot-hooks. But it is a safe and saving legend for the whole of life. Precision is a habit as well as an instinct, and, like all habits, it can be cultivated and cherished. Date your notes; date your photographs, and put your name upon them; keep your papers, your letters, your bills in order, and you will save time, temper, trouble. So mote it be.—*Harper's Monthly.*

THE CHEMISTRY OF GELATINE.

BY DR. F. CRACE CALVERT, F.R.S., F.C.S.

[The application of gelatine to photographic purposes gives an especial interest to the following remarks on gelatine, glue, bone-size, chondrine, their preparation, chemical properties, nutritive value, and application to arts and manufactures, extracted from one of the recent Cantor Lectures, delivered at the Society of Arts, and given fully in its *Journal*.]

As the syllabus will show you, I intend to draw your attention, especially in this lecture, to gelatinous substances, as well as to the art of tanning. There are four distinct gelatinous substances obtained on a commercial scale from animal tissues and bones, viz., *osseine*, which I mentioned in my last lecture, *gelatine*, *chondrine*, and *isinglass*.

Osseine, as already stated, is the animal matter existing in bones, and no doubt it is the same substance which also exists in skins, both during life and when recently removed from the animal. It is characterized by its insolubility, its inability to combine with tannin, and, lastly, the facility with which it undergoes a molecular change, and becomes converted into gelatine, slowly, when boiled with water at 212°, rapidly, when boiled under pressure at a higher temperature, and very gradually under the influence of putrefaction.

Gelatine is a solid semi-transparent substance, which absorbs water in large quantities (40 per cent.), becoming thereby transparent. It is very slightly soluble in cold water, but very soluble in boiling water; and this solution has the characteristic property of forming a jelly on cooling. So powerful is gelatine in solidifying water, that one part of gelatine will form a jelly with 100 parts of water. It has been observed that gelatine loses this valuable property if boiled for a long time at ordinary pressure, or if carried to a temperature above 223° Fah. Before examining the interesting action of acids upon gelatine, allow me to mention that whilst solid gelatine resists putrefaction for a long time, its solutions have a tendency to putrefy rapidly, but I have the pleasure to inform you that a few drops of a substance called carbolic acid will prevent putrefaction for a long period. Gelatine dissolves readily in acetic acid, of moderate strength, or vinegar, and this solution, which is used as glue, has the useful property of remaining fluid and sound for some time. But a Frenchman, named Demoulin, has introduced, of late years, in Paris, a solution of glue which is superior to the above and to that in common use, because it does away with the trouble of constantly heating the glue-pot. His process consists in melting one pound of best glue in one pound of water, and adding gradually to the two one ounce of nitric acid of sp. gr. 1·36, heating the whole for a short time, when the fluid glue is prepared. The action of concentrated nitric acid on gelatine is most violent, giving rise to several compounds, amongst which may be cited oxalic acid. The action of sulphuric acid on gelatine is important in a scientific point of view, as an alkaloid called leucine is produced, as well as a sweet substance called glycocolle, or sugar of gelatine. Gelatine is distinguished from other organic substances by the following chemical reactions:—It gives a white precipitate with alcohol, also with chlorine, none with gallic acid, but one with tannin, or tannic acid. The properties of this precipitate are most important to us, as it is on the formation of it in hides that we ascribe their conversion into leather. The relative proportion of these two substances (gelatine and tannin) in the precipitate varies with the respective proportions brought in contact, but precipitates containing as much as 46 per cent. of tannin have been examined. It is insoluble in water, and presents the invaluable character of not entering into putrefaction. Beautiful fancy ornaments have recently been introduced in Paris by M. Pinson, called artificial tortoiseshell, which he obtains by melting, at a moderate temperature, gelatine with a small amount of metallic salts, running the whole into moulds, staining the mass with hydro-sulphate of ammonia, so as to produce an imitation of the grain of tortoiseshell. The objects so produced are then polished and ready for sale. Before entering on the manufacture of various qualities of gelatine, I should wish to state that there can be no doubt, from the researches of Magendie, as well as from the report of the commission appointed by the Netherlands Academy of Sciences, that gelatine as food possesses no nutritive value whatever. Allow me now to give you a rapid outline of the methods followed in the manufacture of various qualities of gelatine. The first quality of gelatine is prepared by taking the clippings, scrapings, and fleshings from

the tanyard, treating them with lime water or alkali, to remove any smell and certain impurities. They are then well washed and left in contact for a day or two with a solution of sulphurous acid. They are then placed in a suitable apparatus with water, and heated, when the osseine is converted into gelatine. This is run into a second vessel, and a little alum added, to thrown down any impurities that may be in suspension. The liquor is now ready to be run into another pan, where it is concentrated to the necessary consistency, so as to become solid, when it is run into wooden moulds. Eighteen hours afterwards the gelatine is turned out of these moulds on to a wet slab, where it is cut into slices by means of a copper wire; these slices are placed on wire gauze frames, and left in a drying shed until they are perfectly dry and ready for the requirements of the trade. The second quality of gelatine is prepared by placing bones in large cylinders, and allowing high pressure steam to arrive at the bottom of the cylinder, which rapidly converts the osseine of the bones into gelatine, and the removal of this is facilitated by allowing a stream of hot water to enter the upper part of the cylinder. The solution of gelatine thus obtained is evaporated, and is usually employed for the preparation of glue. A third quality is prepared by treating bones with hydrochloric acid (as referred to in my first lecture), and submitting the osseine thus obtained to the action of steam. Lastly, a fourth quality of gelatine, called bone-size, is manufactured by boiling more or less decayed bones, as imported from South America and elsewhere, the flesh of dead animals, &c., and concentrating the solution to the consistency required for the various applications it receives in commerce. [The lecturer then described the mode of obtaining the beautiful thin coloured sheets of gelatine used in photography and other fancy purposes, and also the characteristics which distinguished good from bad glues.]

Chondrine, or cartilago gelatine, first noticed by Messrs. Müller and Vögel, jun., is interesting as possessing qualities, not only different from those of gelatine, but such as injure the quality of the latter when mixed with it. In fact, it gives precipitates with acetic acid, alum, persulphate of iron, and other salts; and as gelatine is often used in connection with these substances, it is easy to foresee how these precipitates may interfere with its application. On the other hand, the quality possessed by this peculiar gelatine, may, I think, render it serviceable in the art of calico printing, for fixing colours, or as a substitute for albumen or lactarine. Thus the solution of chondrine and acetic acid may be mixed with any of the new tar colours, and the whole printed, allowed to dry, and steamed; the acetic acid will be driven off, leaving the colour fixed by the chondrine on the fabric. Chondrine is prepared by submitting to the action of heat and water the cartilaginous tissue of animals or the bones of young animals.

Isinglass is obtained from the air-bag or swimming-bladder of several kinds of fish, especially those of the sturgeon tribe, and, although imported from various parts of the world, the principal supplies are from Russia, from whence the best qualities come, which bear the names of Beluga, Volga, or Caspian Sea leaf. Brazil, New York, the East Indies, and Hudson's Bay, also supply various qualities of this valuable substance. It also reaches this country in different states, viz., in leaf and in honeycomb, that is, the bag is cut open, cleaned and dried; and the quality called snow-bleached is enhanced in value by having been buried in the snow on the banks of the Volga for a long period, by which the isinglass is whitened. Pipes, purses, and lumps are bags which have been cleared but not opened; and a quality called ribbons is made by rolling the bag and cutting it into strips before shipping it to this country.

I shall now endeavour to explain to you how the beautiful preparations before you, for which I am indebted to the kindness of Mr. James Vickers, are obtained. The leaf bladder is first softened in water, and rolled out, under high pressure, into thin leaves, which may extend to several feet long; these, in their turn, are drawn under a number of revolving knives, making 1,000 revolutions per minute, by which 6,000 of the well-known fine threads are produced in every minute. This quality is chiefly used for culinary purposes. For commercial uses the purses or lumps above mentioned, are chiefly employed. These are soaked in water for two or three days, cut open, certain useless parts removed, further softened, rolled, and cut into various dimensions, according to the requirements of trade, their chief use being the clarification of beer and other alcoholic fluids, for which gelatine cannot be employed, because it dissolves in water, whilst isinglass merely swells. The result is that the highly-swollen and extended mass, when poured into beer, wine, or other alcoholic fluids, is, on the one hand, contracted by their alcohol, and, on the other hand, it combines with their tannin, forming an insoluble precipitate, which, as it falls through the liquor, carries with it the impurities in suspension, and thus clarifies the fluid. As isinglass is very slow in swelling out in water, brewers employ an acid fluid for the purpose, but, strange to say, instead of using pure acetic acid, many of them take sour beer, and thus run the great risk of spoiling their sound beer. I have known instances of great losses occurring in this way, acetous fermentation having been thus spread through an entire brewery during the summer months. As a large quantity of gelatine, cut into shreds, in imitation of isinglass, is sold at the present day, it may be useful to know that detection is very easy, by the following method:—Place a small quantity in hot water, in which gelatine will readily dissolve, whilst isinglass will do so very slowly. I cannot conclude the examination of this interesting class of substances without drawing your attention to the fact that osseine, gelatine, chondrine, and isinglass present marked differences in their textures and general properties, although their chemical compositions may be considered identical, thus:—

	Osseine.	Gelatine.	Chondrine.	Isinglass.
Carbon	50·4	50·0	50·61	50·56
Hydrogen	6·5	6·5	6·58	6·90
Nitrogen	16·9	17·5	15·44	17·79
Oxygen	26·2	26·0	27·37	24·75

Esculent Nests.—I must not omit to mention, in connection with this interesting class of substances, these curious gelatinous products, which are not only considered great delicacies in China, India, but even in Europe, where they realize from £3 to £7 per pound; considerable quantities are imported into England. It has long been a disputed question what is the chemical nature of the substance composing these nests, which are the product of a peculiar kind of swallow: but Mr. Payen, by his recent researches, has left no doubt in the minds of chemists that it is an animal, not a vegetable, matter. In fact, it is a peculiar mucous substance, secreted by the bird, and composed of carbon, hydrogen, oxygen, nitrogen, and sulphur. Further, it is insoluble in cold water, but soluble in boiling, and differs from gelatine and isinglass in that it does not gelatinize as it cools.

REMARKS ON POSITIVE PRINTING BY DEVELOPMENT.*

BY M. CAREY LEA.

In the course of a series of experiments on printing by development on plain paper, I examined the effect produced by the introduction of various metallic salts into the developing bath of gallic acid. One metal, and one only, produced marked effects. This was *lead*, especially in the form of acetate, and, though to a less degree, as nitrate. At the time I believed this observation to be wholly new, though I have since ascertained that the accelerating effect of lead salts had been already noticed. But the observations hitherto made have been very imperfect. They have referred, I believe, only to negative development; the proper mode of application has been misunderstood, and the extraordinary results that can be attained as to dilution of the developing bath have not been known. The muddy liquid produced by the addition of acetate of lead to gallic acid, full of its precipitate of gallate of lead, has been employed, whereas it is easy by proper treatment to bring the gallate of lead into solution, and then its real energy manifests itself. In this way it becomes possible to work with a solution of gallic acid containing only *one-sixtieth* of the strength usually directed, that is, instead of five grains to the ounce, a developing bath may contain only one-twelfth of a grain of gallic acid. The strength which I preferred to work with was one-sixth of a grain to the ounce, or one-thirtieth the usual strength. The following is the mode of working.

To prepare a 24-ounce developing bath, take 4 grains of gallic acid, dissolve them in a few ounces of water, add about

* Read before the Philadelphia Photographic Society, May 4, 1864.

half an ounce of a 30-grain solution of acetate of lead, of which a supply may be conveniently kept. A curdy white precipitate falls; next add acetic acid till this precipitate re-dissolves. As I prefer a rather slow development, I add a little more acetic acid than is necessary to effect complete solution; this is a matter depending upon the fancy of the operator. Filter the solution and dilute to twenty ounces. To four ounces of water add a few drops of silver solution, and mix with the rest. It is scarcely necessary to say that all this is to be done only immediately before the bath is wanted. The solution of gallate of lead in acetic acid will not keep more than a few hours, after which it is re-precipitated spontaneously.

I preferred, contrary to the usual custom, to develop on chloride of silver, without either iodide or bromide. The exposure required is a little longer, say from half a minute to a minute in good diffused light, but this is a matter of no inconvenience. The sensitizing bath may be very weak; ten grains to the ounce is quite sufficient. If a stronger bath is used, it will be unnecessary to add silver to the developing bath as above directed. I should state that my experiments were confined to the printing of engravings from strong negatives, and that my remarks as to the advantage of chloride of silver applies only to such. Iodide and bromide may have their advantages in printing landscapes, or solar camera work. Chloride gives the cleanest pictures, and is the easiest managed; and when the exposure is continued until the print passes through the violet stage, and reaches a pale chocolate colour (say, by forty to sixty seconds' exposure), the finished print is almost equal to a sun print.

I say *almost* equal, for my conclusion was, that it was difficult to bring up a developed print to the excellence of a sun print, and that the average of the one showed a slight, but distinct inferiority to that of the other. I find a similar statement made by Mr. Hardwich. I therefore do not agree to the opinion, not unfrequently expressed, that the method of printing by development will one day supersede the other. It has, however, undoubtedly the advantage of rapidity and cheapness. As to rapidity, an operator having two very large developing baths before him, and having a boy to change the paper, and expose the negatives, ought, I should judge, to be able to get fifty prints each from two negatives in an hour. The advantage lies not so much in the shortness of exposure, because that may be counterbalanced by its using more negatives, but in avoiding the need of opening the frames and examining the print, to hit the exact exposure necessary. If the bath is arranged to develop a print in about five minutes, and the baths be sufficiently large to contain in all a dozen prints of $6\frac{1}{2} \times 8\frac{1}{2}$, without covering each other, the operator can watch them all, and remove each at the exact moment required. This would give a larger number to the hour than that which I have mentioned above. The greater cheapness arises from the possibility of using a sensitizing solution of only ten grains of nitrate of silver preceded by a very weak salting bath.

The great dilution at which the bath may be used by the modification just described, renders it possible, without extravagance, to use large and abundant baths. Under the old system, an ounce of gallic acid would make only five twenty-ounce, or two fifty-ounce baths. As here directed, it will make sixty of the latter baths, or a hundred and fifty of the former. Instead of developing the print in a paper dish, made by folding up the edges of the print itself to economize the gallic acid, and watching anxiously to see that it does not cockle up, and lift itself out of the solution in spots, the operator uses an abundant bath, and rejects it the moment that it becomes suspicious. Conducted in this way, the development of prints is most interesting and beautiful.

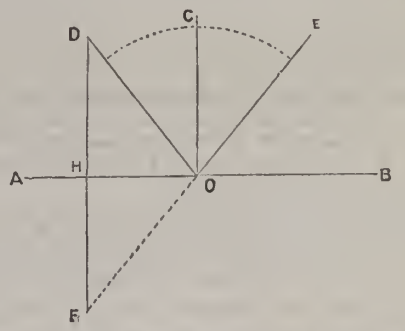
I need scarcely remark that clean dishes are absolutely necessary. I find the best way to clean them is to rub them with a piece of cotton moistened with tincture of iodine. Ordinary cleaning will not do. It is also a good plan to line the dish with well-sized paper, by folding this up to the same shape.

What is wanted in the development process is a treatment which shall bring the print to a good colour in the development bath, and resist the reddening effect of the hyposulphite, so that the necessity of toning may be avoided. Blanquart-Evrard used old hyposulphite, and thus sulphurtoned his prints. Notwithstanding this, they are said to have been very permanent; certainly one would not, *à priori*, have expected such a result, and this proceeding could not be recommended. If the prints could be brought to such a condition in the developing bath, that they only needed fixing in fresh hypo, they could be produced very cheaply, and with great uniformity, and if not good enough to satisfy photographic amateurs, they could at least be appropriate for illustrations to books, and would be far superior to many of the lithographs and line engravings now used for such purposes.

The method which I have here described of bringing the gallate of lead into solution, will, doubtless, allow of its application advantageously to the development of negatives, either by the dry or wet processes, a point on which I have been as yet unable to make experiments. For accelerating the slow developments in some of the collodio-albumen processes, it would doubtless be very useful.

THE SCIENCE OF A RAY OF LIGHT.—*Continued.**

In the figure let the line A B lie on a smooth plane, as of marble or a piece of plate glass, then, if an ivory or glass ball be allowed to fall perpendicularly on this plane, as in the direction C O, it will return upon its path after inpact at O; in common language, it will rebound, and in the direction of O C. If the ball were to fall or be projected obliquely, as from D to O, it would rebound obliquely from the point of impact on the opposite side of the perpendicular in the direction O E.



The nature of this act of rebounding never changes in reference to two characteristic properties; the first is this: if the direction of the falling ball be along D O, *on the surface* of the paper, then the direction of the rebounding ball will also be *along the surface* of the paper, along the line O E; and, secondly, the angle D O C is equal to the angle C O E, that is, D O and O E always make the same angle with the perpendicular or normal C O.

These properties are not limited to glass and ivory; every other elastic body is endowed with them, and the more perfectly so as the elasticity is nearer perfection.

But now a very remarkable circumstance is presented to our view; it is observed that light and sound act in precisely the same manner, in regard to this rebounding, as elastic balls of matter, with this simple difference, that the elasticity of the former is perfect, whilst that of the latter is not so.

The laws of reflection, briefly expressed, are:—

1st. The angle D O C, or the angle of incidence, is equal to the angle C O E, or the angle of reflection.

2nd. The reflected ray is found, in reference to *unchanged light*, in the same plane with the incidental ray.

* From *Humphrey's Journal*.

There is no exception to these laws as long as light has not been changed by what is termed polarization, produced by reflections at a certain angle, which depend upon the nature of the materials of the reflecting media, or by refraction through certain crystalline substances.

By means of these laws many interesting experiments can be performed and calculations made. The whole art of fixing screens in the glass house, of posing the model, and of opening shutters so as to illuminate the model correctly, depends solely upon the proper application of these two laws. By means of them we can accurately calculate the position of a picture produced by reflection, and from this position we derive two additional laws, namely :—

1st. That the picture of an object is always found on the *axis* of that object; and,

2nd. That the position of the picture is always determined by the crossing of any reflected ray and the axis; and,

3rd. That the distance of the picture from the reflecting surface depends upon the curvature of this surface.

Now the *axis* of an object or radiant is a line which is perpendicular to the reflecting surface; thus, for instance, let D be a minute light or object in front of the mirror A B; we know that it will shine in all directions; but, in reference to the mirror, it will form a sort of cone of light, of which cone the line D H will be the axis; this line is denominated the axis of the radiant, and in this line the picture of D will be found. The position of the picture is determined as follows :—

Take any impingent ray from D, as, for instauce, D O on the mirror A B; at the point O, where it falls upon the mirror, draw the normal C O, and on the other side of the normal draw the ray O E, so that the angle D O C shall be equal to C O E; furthermore, continue this ray uutil it *crosses the axis D F;* the picture of D will be at F.

Now, because the angle D O E is equal to the sum of the angles O F H and O D H, and D O C and O D H are equal, therefore O D H is equal to O F H; consequently the distance F H is equal to D H. The picture, therefore, reflected by a plane mirror is as far behind the mirror as the object is in front of it.

Knowing this fact, it becomes an easy task to show whether a picture of an object with a given mirror can be seen or not; if a line drawn from the position of the picture to the eye cuts the mirror, then the picture is visible to that eye, otherwise it will not be visible.

It happens, aud that frequently, that the axis does not pass through the mirror, but simply through space where the mirror would be located if it were extended. The position of tho image is still upon this axis, and always as far behind the mirror, or its imagined extension, as the object is in front of it.

The picture of a person who stands on a mirror will appear as if he were standing on his head in space; the pictuae and the object are exactly antipodal, in contact, and form one and the same straight line.

This property is beautifully exemplified by the reflection of trees, &c., on the banks of a river, or by that of objects on a ship sailing on a calm sea.

If a mirror be inclined at an angle of 45 dogrees, and a person stand before the mirror, his picture will appear as if he were lying on tho ground; that is, it would appear horizontal.

The picture of the moon, reflected from the sea, is seen as far below the surface of the water as the moon is above. It is no difficult matter for the experienced navigator, even on the rocking ship, to measure the angle subtended by the moon and its image; half of this angle, corrected for *dip* and *refraction*, is the altitude of the moon.

Each observer beholds an illuminated streak between himself and the moon on the ocean, whilst all the rest of the waters are comparatively dark; if a ship happen to cross this streak, it becomes brilliantly lighted up : and, on leaving it, becomes again immersed in apparent darkness. This is, however, an illusion; for the persons on the ship meanwhile have undergone no change of light. This phenomenon is owing to the fact that the reflected rays are always found in the same plane with the incidental, and that the eye can see only those rays which are in the same plane with itself, the radiant and its picture.

Transparent media, whose faces are parallel and polished, reflect pictures at both surfaces. This is observable quite distinctly on the cars, when the lamps are lighted, of which two *reflected* pictures are visible from the inside and outside surface of the glass windows. The third and inverted image, which is also visible at the same, is produced by another property of light to be hereafter discussed.

From this circumstance, metallic mirrors alone are adapted for astronomical purposes, where only one picture is required.

If an object be placed between two plane and parallel mirrors, it will give rise to an infinite number of images at regular distances apart, until they finally become invisble by reason of their distance. The cause of this is manifest: the first image on one mirror becomes a new object for the second mirror; this produces a second picture, which, in its turn, becomes a new object for the first mirror, and thus gives rise to the third picture; thus each succeeding picture with one mirror becomes a new object for the other mirror, *ad infinitum.*

An object placed between two plane mirrors inclined at a given angle, will give rise to a definite number of pictures The number depends upon the angle at which the mirrors are inclined, and is equal to the quotient (less one), arising by dividing the complete circle, or 360 degrees, by the number of degrees in the angle of inclination. Thus, if the mirrors be inclined at an angle of 30 degrees, and an object be placed between them, there will be visible eleven pictures.

This property is made available in the kaleidoscope.

We cannot leave the subject of reflection of light without impressing upon the photographic student the necessity of studying this branch of physical knowledge thoroughly. Its laws are quite simple, and require but very little mathematical instruction to understand them. Many difficulties about light, arising from a multiplicity of reflections, or its absolute or comparative deficiency in certain positions of the background, screens, or sitter, will vanish with the same rapidity as the shadow of a cloud on the emergence of the sun from behind its opacity, the momeut the artist comprehends the *why and the wherefore.* The task of the artist in this respect is very simple; ascertain first the direction of the light as it proceeds from the sky light or side light; next cast your eye upon the reflecting objects that may be made available in modifying this light, and removo those that might be useless or prejudicial. The application of those which may be used depends in every respect upon the laws of optics just enumerated, which may be here repeated: *the angle of incidence is equal to the angle of reflection, and the incidental and reflected ray both lie in the same plane.*

Proceedings of Societies.

The American Photographical Society.

The regular meeting of the society was held at tho University, on Mouday evening, June 13th, 1864, Professor John W. Draper in the chair, O. G. Mason, Secretary.

On the meeting being called to order, the minutes of the last meeting were read and approved.

Professor Seely, chairman of tho committee on membership, reported for election tho names of Mr. Charles A. Palmer, and Mr. George H. Weeks. By uuanimous voto of tho society the candidates were elected to membership.

Professor Seely read a paper upon a new method of correcting the negative silver bath (see p. 332).

Mr. Duchochois thought that whatever organic matter tho silver solution contained combined with tho oxido of silver used to neutralizo tho acidity of the solution, and that it was thus discoloured by the oxide.

Mr. Newton was asked to give the details of some further experiments upon waxed or resinous papers. He stated that he had succeeded in producing a good negative from statuary in thirty seconds, and a portrait from life in forty seconds, using the light of an ordinary side window; and outside views in forty-five seconds, through a diaphragm with seven-sixteenth inch aperture. He had prepared his paper with gum benzoin and gum sandarac. The paper was drawn through an alcoholic bromo-iodizing solution. He found that one-half ounce of gum benzoin was sufficient for six ounces of alcohol, his developer was two and one-fourth ounces of gallic acid, ten ounces of alcohol, and four ounces of acetic acid. To one ounce of this solution he added two grains of nitrate of silver. The temperature of the developer was about 98 or 100 degrees.

Colonel Pike considered Mr. Newton's process the best yet given to the photographic public. He had made very fine negatives by the process, and thought that with proper care they might be made in twenty-five seconds; negatives from which as good positives could be printed as were made from ordinary glass negatives; and for its convenience he should highly recommend it to tourists and others. Colonel Pike recommended a developer composed of a saturated solution of gallic acid, to each ounce of which he added twenty grains of silver when the picture began to appear. If the imago did not develop readily, he then added a little citric acid to the developer.

Mr. Duchochois thought that by the use of pyrogallic acid and warm developer, greater increase of sensitiveness would be obtained.

Colonel Pike preferred floating or flooding the picture with the developer, rather than immersion as recommended by Mr. Newton.

Mr. Newton said that by immersion he was enabled to develop six or eight prints at once. He found that the benzoin paper worked well with such development, but that prints by the old wax processes would become spotted if so treated.

The President inquired if the members had used any of the recently published carbon processes?

Colonel Pike had made some very successful experiments with carbon; he had succeeded in transferring the impressed film to plaster and electrotyping it, and he hoped to be able to lay some specimens before the society at its next meeting.

Mr. Hull laid before the society a fine photograph of a cast said to have been taken from the face of Shakspeare after death; accompanying the photograph was a letter, from which the secretary read the following extract, in relation to the history of the cast:—"There is not a doubt about the genuineness of the cast, for its history is accurately traced from Gerald Johnson, the sculptor of the tomb, in 1616, up to the time it came into the possession of Prince Albert; and, indeed, it bears upon its face indications of its genuineness. Johnson had it taken, and used it as a model in cutting the bust of Shakspeare. It was subsequently sold to a German Ambassador at the Court of England, who took it to his own country, where it was very carefully preserved, and finally came into the possession of Prince Albert, after whose death it was removed to the British Museum, where it was photographed, and now is." The picture, though small, attracted considerable attention.

Mr. Root, of Philadelphia, presented to the society, through Colonel Pike, a copy of his recent work, entitled "The Camera and the Pencil."

Mr. Hull introduced the subject of providing a building or room for the exclusive and permanent use of the society, a room in which cases for the cabinet of the society could be arranged, and upon the walls of which pictures could be hung for exhibition.

Professor Joy moved that a committee of three members be appointed, and named a committee of ways and means; and that such committee be empowered with authority to procure such building or rooms as they might deem best for the interests of the society; and he nominated for such committee, Messrs. Hull, Mason, and Pike.

After some general discussion upon the means and wants of the society, the committee nominated by Professor Joy were unanimously elected.

Mr. Mason moved that the corresponding secretary be instructed to transmit to Mr. Root the thanks of the society for his valuable donation of "The Camera and the Pencil." The motion was unanimously carried.

The society then adjourned until the second Monday in October next: at which time it is anticipated that the committee will have secured a permanent place of meeting.—*American Journal.*

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, July 27th, 1864.

The carbon prints sent by Mr. Pouncy to our Photographic Society, referred to in my last letter, were accompanied by the following instructions, which refer to the paper sensitized with printing ink according to the inventor's patented process.

"The paper must be kept flat between the leaves of a book.

"Place the non-prepared side in contact with the negative in an ordinary printing frame, taking the precaution of putting a sheet of bibulous paper under the prepared side.

"A good negative will require an exposure of three quarters of an hour in the sunshine.

"The exposure must also be increased or diminished according to the intensity of the negative.

"After withdrawing the paper from the pressure frame, put it between the leaves of a book until it is convenient to develop the picture. It may be kept in the dark any length of time before development.

"In case the bibulous paper adheres to the prepared paper, they must be immersed together in the developing solution and cautiously separated.

The proof is developed by immersion in a white flat dish filled with spirits of turpentine, which serves for use an indefinite period. After it has served, it is decanted into a bottle having a funnel in its mouth, in the neck of which a tuft of cotton is inserted.

"In thus decanting the spirit, the black in excess is easily separated.

The development is finished with fresh spirits of turpentine. On removal from this bath, the proof is laid on a piece of cardboard covered with blotting-paper, fastened at each corner with a pin, putting at the lower corners a strip of blotting paper to soak up the excess of turpentine.

"The proof is then left to dry in the light.

"Over-exposed proofs give good results when viewed as transparencies.

"When the spirit is overcharged with ink it may be sold to house or ship painters to mix with dark colours."

In presenting a copy of their work entitled, "Theoretical and Practical Researches on the Formation of Positive Photographic Proofs," Messrs. Davanne and Girard made the following remarks:—

"The work we have the honour of presenting to the Society comprehends the several *Mémoires* which, during the past ten years, have been submitted to it. It embraces the whole of the operations involved in positive photography, and describes them all successively in detail. Some of our colleagues, who desire to follow these researches from their commencement, have expressed their regret that they should be scattered through the monthly numbers of the *Bulletin*, we therefore resolved to collect them into a volume for separate publication. Such, then, is the origin of the work we now offer to the Society, and in which photographers may follow the production of a proof, both in a theoretical and practical point of view, from the time the paper leaves the factory to the day when, fixed and toned, it is ready to be framed or take its place in the album."

M. Girard also presented to the society, in the name of M. Barreswil and himself, the last part of the *Dictionnaire de Chimie Industrielle*, published under their editorship; the work is now completed.

M. Antony Thouret persists in applying the electric light to the printing of enlarged positives. He has pointed out the various causes capable of marring the success of the proof; to obtain an enlargement of 4½ diameters with Bertsch's small megascope, requires an exposure of three hours and a-half, because the collecting lens transmits only

one-tenth of the light emitted, and still the resulting proof is incomplete. M. Thouret praises the new regulator invented by M. Foucault, constructed by M. Duboscq, the luminous point is admirably steady; he also very correctly observes, that there is an advantage in mounting the pile in *surface* and not in *tension*, so as to diminish the length of the luminous arc, and augment its lighting power. He also hopes soon to be able to arrange a parabolic reflector, which will allow him to turn to account a much larger quantity of the light emitted, and consequently to produce satisfactory proofs.

In reply to a remark by M. Girard, that we may execute enlarged pictures by the magnesium light, M. Saint Edme replies, that if this system of lighting is in vogue at present, it is purely as a matter of curiosity; but he continues to think that it is not destined to play a practical part. As to the photogenic properties of this light, they are undoubted; its spectrum is rich in violet and probably in extra-violet rays: but although it can be applied to *instantaneous* proofs, it is almost impossible to properly lighten, and in a continous manner, a negative placed in any kind of apparatus whatever; besides, the price of the metal is very high. The sun then remains the true practical source of light. The magnesium light is a very attractive and curious experiment in physics; an analogous effect may be obtained with calcium, a metal as rare as magnesium, but which M. Bovart has succeeded in preparing in large masses. Besides, all the metals of this family possess a similar property.

MR. McLACHLAN'S PATENT BLINDS.

Sir,—In your publication of the 22nd inst., there is a letter from Mr. Brothers, complaining of the usage he has received at my hands, and at the same time cautioning photographers against me.

Mr. Brothers has certainly told a very nice story, and (as was his object) well calculated to harrow the feelings of any one possessing the least sense of justice.

But there happens to be a reverse side to Mr. Brothers' picture, and it is this:—that I can prove all he has said from first to last to be wilful mis-statements. Mr. Brothers gives your readers to understand that I pounced upon him so suddenly that he had no time allowed to collect his thoughts, or to take action.

The simple facts of the case are as follows:—On the 9th of July, I applied to Mr. Brothers for £5, my usual charge for royalty. In less than an hour he returned my note, and repudiated my claim. On the 12th inst., I informed him that unless it was paid on the 15th inst., I intended to place it in the hands of my solicitor. On the 14th inst., Mr. Brothers wrote to say that if I would give him the name of my solicitor he would pay the money (under protest). On the 16th inst., the money was paid to my solicitor *without* any protest, and an agreement was voluntarily signed by Mr. Brothers, accepting of a licence from me to use my blinds. Again I can prove that he used an adaptation of my blinds nearly the whole of last summer, and not only the short time which he states.

To make me appear to your readers very arbitrary, he instances the case of an individual who paid me £5 for hanging up one or two pieces of calico. Knowing how sensitive Mr. Brothers is to any species of injustice, I hasten to inform him that no such imaginary individual exists, as I have never charged any one £5 under such circumstances, and I defy him to prove it.

From the tenor of Mr. Brothers' letter it is plainly to be seen that he wants to form a league against me, to resist my patent rights; at the same time that he has signed an agreement with me for the actual use of them; he evidently wishes some other simpleton to pull his chesnuts out of the fire for him at the trifling sacrifice on his own part of a sovereign or two.

Now, considering that Mr. Brothers has so much evidence against the validity of my patent, it strikes me he would be the very best defendant in an action, and I am willing to accept him as such, but to make it possible, I should have to return him the £5. This I am willing to do, provided he makes an arrangement with me to receive it *without prejudice to an action that I should bring against him*, and this will test the validity of my rights.

Although I cannot understand what Mr. Brothers means by saying that he was not allowed time to collect evidence &c. &c., I should have thought that with the evidence he has in his possession there would have been ample time to have completed his case before the day of trial, which at the very earliest would be some two months from the first proceedings; but to remove all excuse on that point I will allow him a clear month before I commence proceedings against him, and I will thank him to inform me immediately if he will accept my challenge. Now, Mr. Editor, in my opinion there is nothing illegal or arbitrary in asking a person who has violated my rights to pay me my usual licence; it might have been considered uncourteous on my part to have taken law proceedings without allowing him to take a licence from me, but I allowed him time for consideration, and he decided to sign one of my usual licence forms, without any protest or reservation whatever.

In conclusion, I would say that I cannot look upon Mr. Brothers as an ill-used individual, and have experienced no remorse of conscience since his "caution" has been published: also, in reference to the statements that sun blinds had been used in galleries before the introduction of my patent; I would simply ask, why Mr. Brothers and others worked at great inconvenience for some years, unable to keep out the sun, and only adopted my system on the publication of my article.—Believe me to remain, Sir, very truly yours,

Lachlan McLachlan.

9, *Cross Street, Manchester, July 26th* 1864.

[It is no part of our duty or inclination to counsel litigation; but it appears to us from Mr. McLachlan's offer that he is acting with a profound conviction of the justice of his case. Nothing but an action at law will decide the validity of a patent under such circumstances, and also of what constitutes infringement.—Ed.]

RED DEPOSIT ON DEEP SHADOWS, AND THE RECOVERY OF NEGATIVES SPOILT BY BEING CHILLED IN VARNISHING, &c.

Dear Sir,—I have lately had a bottle of "—— plain wet process collodion," with stamped label on cork, although this collodion gave me very good negatives, yet I found the film so absorbent that with every care in washing, I still was often troubled with the red deposit in the deep shadows, and gave up as hopelessly lost several good negatives. Now the other morning I got a remarkably good portrait, I was anxious not to lose it, especially as the gentleman had left the station that very day, and desired it should be sent to him, so after fixing and washing well, I put it in a tray for twelve hours in rain water, changing the water two or three times in the eveniug. I took it out, again washed it copiously, and then redeveloped in my usual way, with pyro and silver taking care not to put too much silver either, it soon became very intense when suddenly, Oh horror of horrors! a red mantle on the deep shadows threw my sanguine hopes of a brilliant impression into the shade. I washed it at once, and then considering of an expedient to recover my prodigal son to an honourable seat in his fathers album, I turned up the Photographic News, and the Almanac; bichloride of mercury was wanted, but that could not be got within a hundred miles, so I thought of that most detested of all chemicals, hypo, detested because "too much familiarity with it has bred contempt of it," Now "a friend in need is a friend indeed." I steeped it in an old bath of hypo, all night, next morning I got up and looked at it, when to my

astonishment I saw that the result of the conflict, was that the invincible hypo had drowned the red deposit, and like a good friend as it really is, intensified (Dr. Diamond's process) the high lights (I enclose a copy from the negative referred to). The same collodion on after occasions gave me like deposits, which by the friendly aid of hyposulphite of soda, I recovered. The above may perhaps not be known to many photographers, would you kindly bring the fact to their notice through the News.

I have all along been using mastic varnish, one part of the gum to ten of alcohol; I find it to be superior to any of the manufactured varnishes. I have printed in a sun of about 150 Fah., and tried it with three or four of the shop varnishes, and kept all together in the sun, the maximum heat of which was as above. When I examined them, I found that all the shop ones had caused the paper to stick and spoil the negative, while the paper on the mastic came off very easily. Ever since that I have used my friend. The only drawback is the risk of chilling while pouring on the varnish; but this is very easily provided against by warming the plate, and coating in a room closed up against all draft, and then warming the plate again immediately after. Now, the other day, by not paying proper attention to this, I coated a plate outside, when a breeze blew, and chilled the plate; the mastic was immediately deposited in flakes all over, and I gave up the negative as lost. An amateur friend was with me; I showed him the negative, and asked him if I could not recover the negative by heating it and then pouring on absolute alcohol, which would redissolve the precipitate, and then by evaporating the alcohol again by heat, leave the varnish transparent he the glass. He said he thought so. Well, afterwards I resolved to try the experiment, but found I had no absolute alcohol, nor any to be had within a hundred miles; so I thought I would tray the mestic varnish itself. So, taking all precautions against another chill, heating the plate, &c., to my delight I got a transparent coating of varnish; the former deposit was redissolved, and the negative was recovered. If you think this also to be of any help to any photographers, you may dispose of it as you like.

When I wish to rub out a varnished negative, I put it first in a tray of cold water, and gradually pour on one side boiling water, thus raising the temperature without cracking the glass, this makes the varnish powdery and rub off very easily; then by a little alcohol, and afterwards plain collodion, restore the plate to its pristine state. By the bye, would a mixture of table salt, chalk, and chloride of gold, answer for toning, as a substitute for chloride of lime and gold.—Yours, &c., H. Senior.

2nd Goorkha Regt.

Murree, May 29th, 1864.

[The mechanical mixture of chlorine and hydrate of lime, known commercially as chloride of lime, is the article required in toning.—Ed.]

Photographic Notes and Queries.

The Albumen Surface Corroding during the Washing of Prints.

Sir,—I wish to ask your opinion as to the enclosed specimens, they being a portion of a day's printing done on Saturday week. I was at first enclined to think that by some inadvertence some cyanide had been sprayed over the prints, but in that case the action would not have been uniform on a large number of prints. I now incline to think the spots are caused by a kind of fungus in the albumen.

As I said, these are prints produced on a Saturday and left in water till Monday. I had laid them aside to show any of my friends, and the matter had almost escaped my memory, till again, last Monday, my assistant drew my attention to the matter, by saying that "the prints this morning are nearly as bad as those were last Monday," and so I found them to my cost. I noticed, also, that the prints had a very offensive smell, like rotten cheese.

I may add that in both instances I had repeatedly changed the water during the Sundays, and also examined the prints and found them quite perfect, so that the defect, whatever it may be, is clearly due to the prolonged soaking, as no trace of it has ever appeared, except on the Monday, when the prints have been washed twice the usual time.—I am, Sir, yours faithfully, George Robert Fitt.

100, *Quadrant, Regent Street, W.*
July 26th, 1864.

[The prints enclosed by Mr. Fitt, are covered with myriads of small spots, in which the albumen is attacked, exhibiting a corroded appearance. We remember seeing some prints in a similar state some years ago, under just the same circumstances, the prints remaining in soak from Saturday to Monday. It was found at that time, we believe, that some soap had fallen in the water, and the corrosive action was attributed to a caustic alkali. Have any of our readers any experience of such cases?—Ed.]

The Cost of Printing Materials.

Sir,—Will you please say what you think would be about the net cost per dozen for *materials* for the production of cartes de visite, allowing for what may be recovered from waste solutions, &c.—I am, Sir, yours respectfully, Carbon.

July 26th, 1864.

[In making such an estimate, very much, indeed, depends upon circumstances. There is a great difference in the mode of working of different photographers for avoiding waste; a great difference in the strength of the solutions employed; a great difference in the mode of cutting up paper; a great difference between wholesale and retail price, &c. Taking, however, the estimate of Mr. Spiller, a very able and careful experimentalist, you have the following figures as to the cost of chemicals: for each sheet of paper, after recovering all that is possible, the silver costs one penny, the gold one penny, and the other chemicals used one half-penny. If you estimate the paper at fourpence per sheet, which is about the cost by the ream, and calculate twenty-eight cards cut of a sheet of paper, you will find that the material for each card costs less than one farthing. But it is probable that in commercial practice it costs considerably more.—Ed.]

Talk in the Studio.

Exchange Club.—Captain Bonamy, of Guernsey, will be glad to enter into an exchange of large pictures. He has shown us some very fine Fothergill pictures of Guernsey scenery, as examples of his style of pictures. They are on eleven by nine plates.

The Photographic Exhibition.—We are authorised to state that the Photographic Exhibition, in Pall Mall, will continue open until Saturday the 14th of August, when it must absolutely close. There have been recently added to the contributions some very interesting illustrations of photolithography, by Sir Mylles Cave, Bart., and some fine carbon prints, by Mr. Henry Cooper, jun. Those of our readers who have not yet visited the exhibition, or who have not seen these additions, will do well to avail themselves of the opportunity.

The Copyright Bill.—The *London Review* states that the law of literary and artistic copyright is to occupy a prominent place in the programme of the Government next session. It is said that Mr. Black has not arranged the various provisoes and conditions of his bill in a manner lucid enough to satisfy Lord Palmerston and his colleagues. When ready, it is to receive the attention of a select committee.

Good for Photography.—A correspondent of *Public Opinion* sends the following suggestion to that journal, which, as it would increase the business of professional photographers, is worthy of all approval at least from that portion of the public, but we fear from few others. He says:—"Murders and robberies, I suppose, ever will take place until that far-off period—the looked for millennium (which, however, ought to be the commencement rather than a period); but, meantime, let us look to detection and probability of it as a prevention. If Mr. Briggs had possessed photographs of his gold chronometer and his chain, and a few copies of the photograph at home, such photographs might have been immediately circulated by the police with pawnbrokers, jewellers, &c., and further copies might have been taken in furtherance of detect-

ing the murderer. My suggestion, therefore, is, *in futuro*, that photographs should be taken of watches, plate, jewels, and valuables liable to be stolen by violence or covertly, and many copies kept on hand, so that an immediate circulation could take place in cases of robbery, when the form, pattern, crests, initials, or any distinguishing marks, should and would aid detection, and so, to some extent, prevent robberies and murders."

MICRO-PHOTOGRAPHS.—The small cylinders of glass comprising a micro-photograph and a Stanhope lens, introduced by M. Dagron, and used in articles of jewellery, such as rings and pins, are receiving more extended application. We recently saw one used as the axis on which the blade of a pocket knife worked, instead of the rivet of metal commonly employed. The knife with three blades, tortoiseshell handle, and micro-photograph, was retailed at three shillings! We regret to add, that, in some of these micro-photographs, applied in a similar manner, our art is prostituted to delineating subjects which shame decency, and pander to the most ignoble and nasty of depraved tastes. We would remind all concerned in the vending of such wares, of the existence of Lord Campbell's Act.

ALUMINIUM BRONZE, consisting of 95 parts of copper, and 5 parts of aluminium, is free from liability to oxidation, and will supersede silver for many purposes.

THE UNITED ASSOCIATION OF PHOTOGRAPHERS.—We understand that the shares in this association are in steady demand, a very large proportion being already taken up. The allotment is announced to take place on the 12th of August.

To Correspondents.

G. W.—If your blinds are so constructed as to constitute an infringement of the patent, the fact of having made them yourself, or having invented them yourself, avails you nothing, unless you can prove that your invention was prior to the date of the patent. This constitutes one of the difficultics of the patent law: the first inventor, if he patent his invention, acquires the sole right to its use and benefit; independent inventors coming after him having no rights whatever. This is, undoubtedly, an evil, but one for which, under the present system, it is impossible to provide a remedy.

A STUDENT.—If you send us an addressed envelope, we will inclose you the address of a gentleman who may aid you. We have given several formulæ recently for saccharа-sulphate of iron; the exact proportions are not of absolute importance; in a developer use 6 grains of sugar candy to 24 grains of protosulphate of iron in 1 ounce of water. Your lighting would, probably, be improved by covering up at least 2 feet more of the side light adjoining the background. You should learn to watch the effect on the face of varying the mode of lighting, without taking a picture. An hour or two spent now and then in trying the effect of different arrangements of blinds, carefully watching the effect on a sitter's face, would be valuable practice in educating the eye and judgment in this important subject.

S. S. C.—Your list is pretty correctly stated, but we should place your second first. Your views of Indian scenery are very interesting, and we thank you for them. The head, No. 23, is very perfect, as the production of a lens of very short focus. It is larger, however, than ought to be produced with such a lens. The kind of distortion produced by the use of a lens of very short focus very close to the object cannot be obviated by any amount of excellence in the lens. The rule you mention, that the larger the head a lens will produce satisfactorily the better the lens, is not one which would be admitted by opticians or purists in the manufacture of lenses. In fact, the converse would be more nearly the truth. The more perfectly a portrait lens is corrected, the less suitable it will be for giving a very large head at a very short distance, especially if used with full aperture. Because a perfectly corrected lens will give a perfect focus only on one plane, and the more nearly it is approached to the object the less depth of focus it will possess, and thus, if the ears were in focus the nose would be out with such a lens, used in such a manner. A lens possessing something of the defect known as spherical aberration would give a more satisfactory picture under such circumstances. Whether the absolute correction which some optical authorities regard as necessary in a perfect lens, be perfection in an instrument intended to produce pictorial results, is another question. Your pictures did not arrive until some weeks after the letter, or we should have answered earlier. We shall insert some extracts from your letter in our next.

J. DYKE.—Pinholes may, as we have repeatedly stated, proceed from a variety of causes. They may proceed from other causes than the state of the bath, sometimes being due to the collodion. If, however, you have assured yourself that it is to the bath the pinholes are due, and you find that diluting the bath, neutralizing, and sunning it, and then adding fresh silver, does not remove them, you may either adopt the remedy of boiling, or precipitating with a carbonate, and redissolving, or you can throw the bath amongst the residues to be thrown down, and the silver recovered.

L. A. D.—If we require a warm tone, we use the acetate bath; if a black tone, we employ a bath of chloride of lime and chloride gold, about one grain of each in 6 or 8 ounces of water, or in summer it may be used still more dilute. It should stand a few days after mixing before use. There is no need to add alcohol.

J. S. W.—Paper may be sensitized at night for use on the morrow, but it should be kept in a dry cool place. 2. Hard water is not good for use in photography at any time, but it may be used for washing prints, if care be used. It would be worth while to boil it for many purposes, and so precipitate the lime salts it contains. 3. If a hypo bath have only been used for a few prints, it may be used again if it is kept neutral, but it is not a safe practice. 4. Toning should not be done in daylight, as the prints are still sensitive to light, and their purity and brilliancy will be insured. 5. Prints should be toned the same day on which they are printed. 6. It is quite possible to obtain negatives with the same collodion and bath as positives, but the best conditions are not quite the same for each. A positive bath contains more nitric acid generally than is suitable for negatives, and the same is true of the developer. Nevertheless, with material working well for positives, it is possible, by giving sufficient exposure, and by subsequent intensifying, to obtain very good negatives.

NIL DESPERANDUM.—If an object be lighted from one distinct source of light, distinct and clear shadows will be cast by the object; but if it be illuminated from several sources, several shadows are formed which interfere with each other and cause confusion. You may easily test this by illuminating an object with half a dozen candles placed in a row. Nevertheless, a small amount of side light from the side opposite the principal side light will illuminate the shadows, and have the same effect as reflected lights in giving detail to the shadows. In the fixed print sent the light is too directly in front, and too much diffused. The negative of the unfixed print, would have been better for a trifle longer exposure. The use of a collodion with a little more bromide would be useful in such a case. See the advice to a "Student" above, as to the best mode of studying effects in lighting.

A. THOMPSON, New Zealand.—We will give attention to your request. For portraiture, a swing back is of little importance. Thanks for your kind invitation and offers of service.

J. F. L.—We are glad that you have found such advantage from the use of a bromide. Bromide of potassium is very sparingly soluble in collodion. The bromide of cadmium or of ammonium you will find most useful. We may probably, without egotism, accept your compliment for having been chiefly instrumental in establishing the universal use of bromo-iodized collodion. Some years ago, almost all the authorities condemned its use for negatives. They all now approve or tolerate.

PHOTOGRAPHER.—We have repeatedly stated that blistering is a trouble frequently incident to *Rive* paper, which *Saxe* paper is free from. We know of no certain remedy, except the use of another sample of paper. We fear "Photographer" is a very careless reader.

BOND STREET.—If we could decide absolutely which is the most simple, certain, and rapid dry process, we should put an end at once, doubtless, to the practice of all others. Unfortunately, we cannot do so; not only are various processes found best under differing circumstances, but the results seem to vary in different hands, and the evidence on the subject is very conflicting. The tannin process in its simple form is not a rapid process; but various of its modifications, with hot or alkaline developers, give, in many hands, very rapid results. The collodio-albumen process, with hot development, possesses great certainty and is very rapid. In some hands, simply washed plates are very sensitive. But in all dry processes, as sensitiveness is increased, liability to failure increases in like ratio.

TROUBLED.—To avoid the irregular intensifying of which you complain, make the intensifying solution a little weaker, use more acid, and less silver; and flood the plate with the solution once or twice before the silver is added to it. 2. We cannot tell any reason for the scratches of which you complain without seeing them. 3. In using marine glue to join glass, it is necessary to make the pieces of glass hot before applying it. Do this carefully with the flame of a spirit lamp, and heat the marine glue with the same flame. It is desirable to make the glass sufficiently hot to melt the glue even if it be applied cold.

BRIGHTON DABBLER.—We are glad the answer was sufficiently near for your purpose.

AMATEUR.—The purple tint you describe arises from reduced gold in very small particles. If you are only using a toning bath occasionally, it will be a better plan to use only a small portion at a time, and do not return it to the stock bottle. If a bath be used over and over again, it is very important to wash the prints thoroughly before toning them. You may filter out the dark deposit, which will contain a good deal of gold. This may be saved until it has accumulated sufficiently, and may then be converted into chloride of gold by *aqua regia*. 2. When the developing solution decomposes rapidly, it is generally indicative of insufficient acid in the developer. In some conditions of the nitrate bath there is a great tendency to this decomposition, and the formation of a metallic scum upon the plate. The use of more acid will generally effect a cure.

W. SMITH.—From the diagram of your glass house the lighting ought not to be bad, but the pictures seem to indicate the presence of too much diffused and front light. Probably you will find an improvement if you cover with blinds half the glass at the lower portion of the room, the end furthest from the sitter. Your pictures do not appear to be sufficiently clean in the shadows. This is, probably, partly due to diffused light entering your camera through the lens. Do you work with a shade round the lens so as to prevent any light entering except that coming from the sitter? This is very important in securing brilliancy. Next, have you any actinic light in your dark room? See that you have not. Excite a plate, for instance, and allow it to stand five minutes in the dark room, and then develop without any further exposure. If the chemicals are in good condition and the room free from actinic light, there should be no reduction on applying the developer, but the plate, after washing and immersion in hypo or cyanide ought to be clean, bright, and transparent, without any deposit whatever. If there be a grey foggy deposit, either the chemicals are not in good order, or there is light in the room. Finally, expose a little longer, and intensify a little less. The best of your pictures is No. 11. It is very nearly good, and is a pleasing picture. Your backgrounds are not too dark.

Several Correspondents in our next.

Photographs Registered during the Past Week.

MR. J. MARGETTS, 12, Prospect Place, Kingsland,
Photograph of Rev. Thomas Aveling.

MR. J. C. CHALLICOM, High King Street, Whitebaven,
Photograph of Rev. W. H. Jemison.

MR. ARCHIBALD ROBERTSON, 88, Glassford Street, Glasgow,
Three Photographs of Rev. R. T. Jeffery, M.D.

MESSRS. TURNER AND EVERITT, 3, Cheapside,
Two Photographs of Rev. William Morley Punshon.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 309.—*August* 5, 1864.

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THE FOTHERGILL PROCESS.

IT is somewhat curious to observe how in photography, as in many other matters, the influence of what may be termed fashion affects the selection and adoption of processes, especially of dry processes. Honey, gelatine, albumen, malt, raspberry syrup, and a host of similar materials, as preservatives, and collodion without any preservative, have each had its especial rage; and excellent pictures have undoubtedly been produced by their aid. Perhaps no process received so much, and such general attention, as the Fothergill process, and its modifications. It has, however, of late years, been gradually pushed from its stool by the tannin process. The greater simplicity of the manipulations in the latter, and the indefatigable zeal and perseverance of Major Russell in perfecting the process, and his unvarying courtesy in answering all inquiries, and aiding in removing all difficulties, have undoubtedly done much in establishing the tannin process in some of its various forms, as *the* dry process in general use of the present day.

It is, perhaps, worth while now and then, however, to inquire whether some of the old, and, comparatively, disused processes, have not points of excellence worth reconsidering: and we can do this best by examining the works occasionally of those photographers who have remained true to the processes which first gave them good results. We have before us at this moment a series of very charming photographs on 11 by 9 plates, by Captain Bonamy, of Guernsey. These are all by the Fothergill process, but they possess a perfection of delicacy and softness not to be surpassed by the best pictures of the wet process. They include examples of varied subjects, such as rocks and sea, avenues of trees with foliage, architecture, foregrounds with piers, shipping, &c., sea, and a distant coast. We mention this as illustrating that they include every subject which can become a difficult test for a process, and add that in all cases the photography is excellent, and, perhaps, in the most difficult subjects the best result is produced. There is great force and brilliancy, and perfect detail and softness; no approach to soot and whitewash, or any trace of the white sky, at one time regarded as the inevitable result of a dry process. All the skies have a delicate tint, against which the distant horizon is relieved, not by a harsh outline, but by a tender boundary, like that of nature, and there is a perfect feeling of harmony in the pictures.

It is somewhat noteworthy, that when we inquired of Captain Bonamy as to whether he had tried the tannin process, he furnished us with a striking illustration of the accuracy of the view we had expressed in a recent article, as to the cause of blurring, without himself having seen any discussion on the subject, the NEWS containing the article having at the time just gone to press. He had used the tannin process, he stated, and liked it very well in some respects, but gave it up because he could not obtain delicate objects in the distance perfectly defined, the fine cordage of vessels being blurred or swallowed up in the sky. He then selected a view which was an apt test for the subject, and pointed out in the Fothergill picture some very delicate cordage perfectly delineated against the bright sea, which in a tannin plate he always found nearly obliterated. The description of the result clearly illustrated the encroachment of a lateral deposit on each side, blurring and obliterating the fine lines present in the tannin plates, and absent in those prepared by the Fothergill process. The cordage referred to is right in the middle of the plate, and not at the margin, another confirmation of the fact that blurring in the tannin plate was not due to reflection from the back of the plate.

Captain Bonamy stated that there was no novelty in his method of working the Fothergill process, but since there have been many modifications, it may interest our readers if we briefly state the details of his operations. The collodion is any good bromo-iodized collodion; he generally iodizes it himself in order to have some certainty on the subject, using equal parts of the iodides of potassium and cadmium, about two grains of each, and one grain of bromide. The plate is excited in a 35-grain nitrate bath, containing acetic acid sufficient to give a decidedly acid reaction. The plate is then washed in a dish of distilled water, especial care being used to avoid pouring water on the surface until the free nitrate is removed by first washing in a dish. This done, it may be well washed with common water. The preservative consists of the white of egg, with from five to eight drops of liquid ammonia to each egg, well beaten. It is found better after keeping a few weeks or a month than at first. When required for use, it is filtered, and to two parts of the white of egg, one part of an eight-grain solution of bromide of potassium is added. It is to the use of the bromide in the albumen solution, that the delicacy, softness, and perfect cleanness of the negatives is chiefly attributed by Captain Bonamy. This solution is poured on the washed plate, left for a short time, and washed off with distilled water; after thoroughly washing and again rinsing with distilled water, the plate is coated with a solution of nitrate of silver, containing from two to five grains to the ounce, and left to dry. In this state it will keep about three days.

With a single lens of fifteen inches focus, and half inch stop, the average exposure in a good light is about five minutes. The development is with pyrogallic acid and silver employed in the usual manner. The results as we have before said, are unsurpassed for softness, detail, perfect cleanness, and general excellence.

VERMICULAR CRACKING OF THE FILM.

THE peculiar cracking of a varnished collodion film, which leaves the negative honeycombed, with very fine vermicular lines, is familiar to many photographers. The proximate

cause is generally found to be associated with moisture and change of temperature; but the ultimate and predisposing cause appears to be somewhat uncertain. Some negatives in a box will suffer, and others by their side will escape; some photographers have never been troubled with any such evil; we have never had such a thing happen with our negatives, whilst others have lost large batches of valuable negatives. Some attribute the evil to a peculiar tendency in the collodion; others to a defect in the varnish; others to the glass, and others to various causes besides.

We were recently consulted in a very peculiar case, in which, during the present summer, negatives had cracked within a few weeks after they were taken, and it was noticed that all the negatives which cracked were large ones, whilst those on small plates, taken at the same time, and under the same circumstances, remained intact. There was another noteworthy circumstance in the case: all the large negatives, being those which had cracked, were on patent plate glass, whilst the small ones which escaped, were on flatted crown glass. This very naturally suggested the idea that the nature of the glass was the original cause of the evil. Some samples of glass, it is well known, from possessing an excess of certain alkaline salts in their composition, are prone to *sweat*, as it is technically termed; they are readily acted upon by the atmosphere and by moisture, acquiring a dull damp surface, and there can be little doubt that negatives taken on such glass will be liable to injury. The white sheet glass and the white plate glass are peculiarly liable to this defect, and we remember that some time ago Mr. Breese had a number of his fine transparencies ruined by the sweating of a very choice and pure looking sample of white plate, which he had procured in order to obtain the greatest delicacy of effect with delicate pictures. But the case in question admits of explanation on another theory, which has been before put forward, and which we have generally endorsed. It is suggested that the cracking is due to the presence of hygroscopic salts left in the film, which absorb moisture when the negatives are in a damp place, and thus cause cracking. The presence of the salts is ascribed to two causes, either the imperfect removal of the fixing salts by hasty washing, or the employment for that washing of water containing traces of chlorides, &c. On this supposition, as large plates would probably often receive less complete washing than small ones, so much larger surface receiving possibly little more water than the smaller surface, it is quite possible that this cause induced the tendency to crack in the large negatives, without the difference in the quality of the glass having any effect in the matter whatever. It is not easy, however, to determine the matter absolutely without a careful series of experiments.

Next to the discovery of the cause of an evil, it is important to find a remedy. Some time ago, M. Claudet announced at the Photographic Society, a very simple mode of dealing with such cases. It consisted in applying to the surface of the cracked negative finely powdered charcoal, or black lead, applied with cotton wool. This filled up the fine cracks sufficiently to prevent any serious injury being observed on the prints. It is obvious, however, that such a process would need often repeating if many prints were required, and a more permanent remedy was desirable. This was furnished by Mr. H. P. Nichols, to whom our readers are indebted for many ingenious suggestions. In p. 81, vol. vii., of the Photographic News, we published his suggestion, which consisted in submitting the cracked film to the action of a vapour from alcohol, benzole, or chloroform, according to the nature of the varnish: this has the effect of softening and re-uniting the dissevered edges, and so repairing the evil.

Some months ago, we were consulted by Mr. Spiller, on the subject of some serious cracking of films, which had followed the removal of the negatives into the newly erected photographic department at the Royal Arsenal, Woolwich. In the course of our conversation, we suggested Mr. Nichol's remedy, which Mr. Spiller undertook to try. We are glad to publish the complete success of the experiment. On another page, we print a short communication from Mr. Spiller, in which he describes the modification of this method which he employed, and which appears to have been every way satisfactory. We are glad to be able to record the confirmation of an experimentalist so able and trustworthy in every way as Mr. Spiller, to a remedy so simple and desirable.

PHOTOGRAPHY ON WHEELS.

Having tried during the last two years the dry processes, without experiencing that satisfaction with the results which appears to attend the operations of others, I determined to have recourse to the wet; but although somewhat of an enthusiast in the pursuit of my hobby, whatever it may be, being on the shady side of fifty, I do not feel that pleasure in carrying the necessary *impedimenta* I probably should have done a quarter of a century ago. I thought over all the boxes and tents I could hear of, or see, but, unfortunately, all of them require to be carried by somebody, and whoever that body might be, it was too evident he would have something to carry.

"A mere nothing, sir, I can assure you." Only think of a pushing tradesman recommending a camera to weigh about 25lbs., a tent about 20lbs., a box of chemicals, two tripods, a little water, in all about 60lbs., as a mere "*nothing*," and this to a man with a boot full of corns, rather puffy, a tendency of blood to the head, a proneness to lay in a full meal as a due preparation for a journey, and, as I said before, past fifty.

This "*nothing*" will not do for me, thought I, and what is not to my own taste, I do not like to force upon another: having pondered over the matter, I applied to my carpenter, and the result you see in the accompanying prints. The description is briefly this; a box to which is attached a wheel, two short legs, and two handles, all of which may be removed, the wheel taken to pieces, and together with the two tripods (if folding) water bottle, and many other things packed into the bottom; over these is placed the developing box, containing, in its turn, camera, and all other essentials. It now presents the appearance of a very neat box, which can be moved about by its two handles, and sent by railway to any distance with little risk of injury to itself or its contents. The time necessary to put it together again without assistance, is a quarter of an hour, when the owner, if he cannot bribe some sturdy boy of fifteen or sixteen (my goblin, a lad of thirteen, short withal, trundled mine five miles, on one of the hottest days of last June), a most unlikely case, may, without a blush, wheel it off himself without feeling that he is doing anything "*infra dig.*;" (in confidence I will acknowledge that I heard it once called a "baby's bathing machine.")

Fig. 1.



The Box with Developing Box inside.

Fig. 2.



Developing Box alone, with the same wheel, &c., attached.

The conveniences of such a thing are too manifest to need many words from me; to those fortunate amateurs who live in the midst of "choice bits" of scenery it is invaluable, all they have to do is to pack up what is necessary, including a cold veal-and-ham pie, a bottle of Bass well up, a couple of plates, knives, &c. (don't forget a corkscrew,) which will all stow away in the bottom, when not occupied by the ironwork, and start off. If they come to hilly country, tie a piece of rope to the front drop-handle, and drive in tandem fashion; arrived at the desired spot. The pictures taken, should the inner man prompt, spread the cold collation on the top of the box by way of table, and I'll engage they never enjoyed

a warm dinner at home with more gusto, a cigar afterwards to set all right, and then pack for the return journey.

Since writing the above I have had the necessary fittings attached to the developing box, which I find quite large enough to contain all that is necessary, (not forgetting Bass and Co.), for taking pictures in the neighbourhood only, and of course it is still lighter. To facilitate its construction by others, I now enter upon a description of the developing box. The dimensions inside are 24 inches long, 16 inches broad, and 14 inches deep—the four angles are strengthened with blocks—on three sides I have glass, orange if preferred, mine is white painted over both sides with Aldis's preparation (and very good I find it). In the lid, which opens like that of any ordinary box, is a piece of yellow glass, through which to watch the internal operations; the fourth side contains the sleeves; a drop-handle at each end is useful to lift it from place to place, over stiles and other obstacles; in the bottom are the necessary openings for the bath, tripod, screw, and drain pipe; to this add lock and slides to cover the glass and sleeves, and the box is complete.

The handles are of half an inch rod iron, flattened at one end and turned, slide into iron collars attached to one end of the box, the other ends being inserted into short wooden handles; the legs fit into collars likewise, and are secured like the handles by thumb-screws. The wheel works in iron gudgeons (this I am told is the technical term) in shape like this ⌒ ; the curve gives the advantage of a spring, and likewise allows the box to hang near the ground; these gudgeons slip into flat collars like the other parts, and are also secured by thumb-screws; the collars in this case are attached to a loose piece of elm which slides into a groove underneath the box, and are kept in place by a button; the gudgeons should be made of steel. The wheel, made as light as is consistent with the necessary strength, will draw off the axle if required for the convenience of carriage, but when in use is secured by another thumb screw.

All this is tedious to describe, and not less so, I fear to understand, but a glance at the "convenience" itself would suffice to enable ordinary workmen to imitate it. The whole thing appears to me simple, convenient, and last, not least, cheap, and to the οἱ πολλοι, just what they want. By undoing four screws, and turning a button, the box is ready to be mounted on the tripod. The cost at the outside should not exceed £2; many would get it made for less. Were I making another, however, I should increase the dimensions by two inches each way. The gain of space would be a great advantage, without making any sensible increase in the "propellability" of the affair. I had almost forgotten to say that I have a movable shelf inside for the reception of bottles, glasses, &c. This enables me to keep the fighting deck clear during action.

Apologising for the length of this communication, I leave it to your mercy, and, in the spirit of Nelson, I would exclaim, not "the peerage or Westminster Abbey," but "immortality or the waste-paper basket." SOMERSET.

RESTORATION OF INJURED NEGATIVES.

BY JOHN SPILLER F.C.S.

Your readers may be interested in being informed of a really efficient plan of restoring negatives, the varnished films of which have become honeycombed and partially separated from the glass by the action of frost. A short time since I had occasion to try experiments upon a few negatives, which were injured by the cold and damp during the last winter, and have succeeded, by exposing them to the vapours of alcohol and ether, in causing the uplifted portions to return to their original position on the glass plate. In the present instances it was not even necessary to apply an extra coat of varnish, a precaution which would obviously aid in the preservation of thin and weak films. From the restored negatives we have been able to procure prints in which no sign of the injury sustained has been apparent; it seems impossible to eradicate all traces of the imperfections upon the negative itself, but these do not, however, leave any mark upon the print by which their existence could be discovered.

The mode of working was simply to employ an ordinary glass shade in an inverted position, and having placed therein a mixture of three parts of methylated alcohol and one of ether, the injured negatives were introduced two at a time, and with their coated surfaces outwards, and the top covered with a glass plate. At the expiration of about twelve hours the collodion films had completely subsided, and then required merely to be slightly warmed for the purpose of hardening the varnish. It does not appear that any disadvantage ensues as the result of leaving the film exposed to the alcohol vapour for a longer time than the period actually sufficient to effect the restoration, and I have never noticed any indication of the settlement of condensed liquid upon the plates, so that the film is not under any circumstances liable to slip or become separated.

Royal Arsenal, Woolwich, August 1, 1864.

THE MAGNESIUM LIGHT.

BY M. MC. A. GAUDIN.

If, as seems probable, we succeed in obtaining illumination by magnesium, we shall be indebted for it to photography, for it is the want of obtaining readily, no matter at what cost, a very intense and highly actinic light, that has drawn attention to this new and very curious phenomenon, and which has instigated so many efforts to obtain the metal in wire susceptible of being unwound by suitable mechanism in proportion as it becomes consumed. Till within the last few days I could say nothing about the magnesium light, having never seen it, but as soon as the wire was for sale in Paris I immediately experimented with it.

Magnesium wire is sold in all the principal photographic warehouses of Paris at the very high price of 1,500 francs the kilogramme (or 1½ franc the gramme), instead of 300 francs, the price advertised in England. At this price it must remain merely an object of curiosity, but it is quite certain that as soon as it is employed in large quantities the price will fall to 100 francs or less.

As to the source of lighting, it is evident that photography occupies the first rank in incurring expense; and as I am occupied as much as anyone with lighting great distances by means of parabolic reflectors, I see other very numerous applications which will lead to great consumption, tending to a reduction in the price of the metal, to the great advantage of photography: I now proceed to develop my ideas on this matter.

This magnesium wire is now sold by weight, of a diameter which varies from ½ of a millimetre to 2 millimetres; it is a metallic wire in form only, for it breaks upon the least effort, even in unbending it, an inconvenience that will doubtless disappear as the manufacture is improved. Its specific gravity is 2·5 exactly the same as that of aluminium, if I may trust to a hurried trial. At this rate, the wire of ½ of a millimetre weighs only 20 centigrammes the metre; and that measuring 2 millimetres on the other hand, 7 grammes $\frac{20}{100}$ the metre, and if the first costs only 30 centimes the metre, the price of the larger wire will be 10 francs 80 cents. the metre.

I have experimented only with the wire at 50 centimes the metre, which is quite sufficient to give an idea of the intensity and astonishing whiteness of this light. To inflame and burn it, it is sufficient to take a piece of a few centimetres in length, and holding it in a pair of pincers to avoid burning the fingers, then to put one end into the flame of a candle or spirit lamp, until ignition takes place. As soon as it begins to burn, it spreads very rapidly along

the wire under the aspect of a dazzlingly brilliant little ball which throws up a white smoke and leaves the skeleton of the wire in the state of caustic magnesia. This light is, in fact, very intense, and extremely vivid. With a wire as fine as that indicated, the light emitted appeared to me equal to that of twenty candles, from which I conclude that the wire of two millimetres, burning with the same rapidity, will be equal to that of 300 candles. But the combustion took place at the rate of two centimetres the second, so that the light of 300 candles during 50 seconds, would cost 10 francs 80 cents. This would be paying very dear for the commodity; but I speak now of this phenomenon only with the certainty of a lowering in price one-tenth at least, as soon as means are found of giving an almost invariable constancy of position to the light; and at 100 francs the kilogramme, this light will be, so to speak, economical, and sure to be specially employed in certain cases, if we can succeed in perfectly regulating and concentrating the light in a small volume.

The magnesium light presents much analogy with that of phosphorus, but the absence of all danger and inconvenience in its preparation does not admit of our comparing them together in their economical employment; besides, magnesium being sold in the state of wire, offers great facility for using it. Phosphorus apart, it remains for magnesium to contend with pyrotechnic compositions. This is not much, for to produce a light equal to 300 candles, we must employ chlorate of potassa, and act upon large quantities, which dissipate even more quickly than magnesium, disengagiug a suffocating and voluminous smoke.

The other applications of the magnesium light consist in the production of a very intense luminous point in the focus of a parabolic reflector, moving freely so as to convey signals to a distance, or for illuminating a glacis during siege operations. From the moment that the problem of the fixity of the luminous point is solved, these two applications will be accomplished. It has been ascertained from experiments made in the harbour of Toulon, that a luminous point as large as a pea, giving only as much light as ten candles, radiating from the focus of a parabolic reflector as large as a hat, will illuminate a space of 10 metres at a distance of 1,500 metres sufficiently to enable the smallest print to be easily read, and when it is desired to exhibit it as a lanthorn only, its intensity is equal to the light of a first-class light-house, with a fixed luminous point, this apparatus will become an excellent means for making signals both on land and at sea.

* * * * * * * * *

With a magnesium wire arranged for burning, we can always, without preparation or apparatus for gas or electricity, easily produce a light equal to 100 or even 300 candles during ten seconds, which, with a reflector of 10 inches in diameter, will cause everything passing at 2,000 metres in advance to be seen very distinctly, and this will be the practical and the economical side: for a dozen of light-producing apparatus for gas or electricity, besides the encumbrance of transporting and the getting to work, will cost at least 5,000 francs, and with 5,000 francs, we could obtain by employing magnesium wire at 100 francs the kilogramme, the means of producing many signals; and at this price it will figure largely in military pyrotechnics.—*La Lumière.*

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

(Continued from p. 365.)

Sutton and Schnauss have also set up the opinion that the sensitivity of iodide of silver is always caused by the retention of a trace of nitrate of silver, which is not to be got rid of even by long washing (Schnauss, Nachschlagebuch, p. 144).

I cannot quite agree with either of the views. For the compound $AgI+AgO,NO^5$ is decomposed by the addition of water, and therefore cannot be supposed to exist in solutions of $IAgO,NO^5$ in 10—100HO, such as I employed; nevertheless iodide of silver is blackened energetically in such solutions. The compound $Ag\,I+2Ag\,ONO^5$ also, which was investigated by Risse,* Weltzien, and Riche,† cannot exist in such solutions. This applies also to the compounds of bromide with nitrate of silver described by Risse.

Hence I ascribe the increased sensitivity to light of bromide and iodide of silver in contact with solution of nitrate of silver simply to an action of contact. In the case of chloride of silver, the heightening of the colouration by the same means is so inconsiderable that it may be ascribed solely to the slight decomposition of the nitrate which takes place.

I must likewise deny that the sensitivity to light of iodide of silver is due to a trace of nitrate retained in spite of long washing. I took paper soaked in $Ag\,I^{\beta}$, and well washed with water (the mode of preparation of which shall be described below), and laid it for five minutes in a solution of 5 per cent. of chloride of sodium. If a trace of nitrate were contained in the iodide of silver, it must thus evidently have been converted into chloride of silver. The paper thus treated was well washed and exposed to the light. It behaved exactly like similar paper not treated as above with chloride of sodium. Hence I conclude that a trace of nitrate in the iodide of silver is not the cause of its sensitivity.

In the preceding pages, the chemical changes which chloride, bromide, and iodide of silver undergo in the sunlight, either by themselves or in contact with various substances, have been fully discussed. The results of the investigations may be briefly summed up as follows:—

1. Chloride of silver, prepared with an excess either of the silver salt or of hydrochloric acid or chloride of sodium, is decomposed by light, and acquires a violet (*not black*) colour; it sets free chlorine, and leaves a subchloride (but *no silver*), as asserted by Davanne, Spiller, Malone, and others.

2. This decomposition takes place even in the absence of all moisture, and beneath concentrated sulphuric acid and nitric acid (in opposition to Seebeck's statements).

3. Chloride of mercury (Hg Cl) and fuming sulphuric acid entirely prevent the decomposition by the sun's light. English sulphuric acid and nitric acid only retard it.

4. Solution of sulphate of iron likewise retards the action of light upon chloride of silver (Wetzlar). The cause of this is the absorption of the chemical rays by this solution.

5. Solution of nitrate of silver slightly favours the colouration of chloride of silver in the light. In this case, besides subchloride, free silver is produced, certainly in consequence of the decomposition of the nitrate.

6. Bromide of silver, prepared with an excess either of silver solution or of bromide of potassium, acquires by exposure a pale greyish-violet colour, weaker than that of chloride of silver; it gives off bromine, and leaves a subbromide of silver.

7. This subbromide of silver is decomposed by ammonia, furnishing metallic silver and a solution of bromide of silver.

8. Nitric acid retards the decomposition of bromide of silver by light much more than that of chloride of silver.

9. When heated with nitric acid, the greyish violet [exposed] bromide of silver becomes yellowish grey and lighter, without any silver being dissolved.

10. Solution of nitrate of silver greatly assists the decomposition of bromide of silver by light; under it the bromide very soon becomes intensely greyish black. In this case, not only sub-bromide, but also metallic silver is separated.

11. Chloride of silver precipitated from an excess of silver

* From *Poggendorff's Annalen.*

* *Journal für prakt. Chem.* xxxiii. p. 343.
† *Liebig's Annalen*, cxi. p. 39.

solution is decomposed more rapidly in the light than bromide of silver precipitated from an excess of silver solution. Chloride of silver precipitated with an excess of chloride of sodium, on the contrary, is decomposed more slowly than bromide thrown down by an excess of bromide of sodium.

12. Iodide of silver precipitated by an excess of iodide of potassium is not in the least affected by light.

13. Iodide of silver precipitated from an excess of silver solution becomes pale grey by exposure to light. No iodine is set free, and a chemical decomposition is consequently very improbable.

14. Acids (even when diluted) retard the colouration of iodide of silver in the sunlight; the retardation is most considerable with nitric acid, less with dilute sulphuric acid, and still less with acetic and citric acids.

15. Nitric acid (of sp. gr. 1·2) bleaches iodide of silver which has become grey by exposure to light, and reproduces the original colour, without, however, dissolving any silver. Sulphuric acid only renders the colour lighter.

16. Solution of iodide of potassium instantly renders the deep yellow iodide of silver, precipitated from an excess of silver solution, pale yellow, and insensitive to light: iodide of silver rendered grey by exposure becomes pale yellow by treatment with iodide of potassium.

17. Nitrate of silver favours the colouration of iodide of silver exposed to light in a high degree; it becomes of a deep greenish-blackish grey,

18. When the three salts, bromide, chloride, and iodide of silver are exposed to the sunlight in contact with nitrate of silver, the bromide acquires the most intense colour, and the chloride the weakest.

19. Nitrate of silver in the solid form, and when pure, is not decomposed by light; from its solution a small quantity of silver separates in fine black granules.

20. Iodide of potassium likewise is not decomposed when exposed to light in the solid state; but when dissolved, iodine is soon evolved from it.

In the preceding sections the chemical changes undergone by chloride, bromide, and iodide of silver in the light of the sun have been described in detail. By this means, however, the photographic processes are by no means explained. In these, very different reactions come in question; for the picture upon the photographic plate is not produced by a *visible* action of light, such as the change of colour undergone by the haloid salts of silver when exposed to light. On the contrary, the stratum of iodide or bromide of silver, after short exposure in the camera, does not show the least trace of a picture, but this makes its appearance only after a solution of sulphate of iron or pyrogallic acid (the so-called developing fluid) has been poured over the coat of silver. For the elucidation of these phenomena, the third question proposed above must be answered.

III. *What Changes are Undergone by Bodies Affected by Light in the so-called Developing Process?*

For the solution of this question many important investigations have already been made, by Schnauss, Hardwich, Monckhoven, Davanne, and others.

Schnauss ascertained that a film of *pure* iodide of silver, after exposure, was not in the least effected by *pure* gallic acid, but that the picture is produced by gallic acid upon a film of iodide of silver saturated with solution of silver. He says that the exposed iodide of silver possesses the faculty of attracting and retaining the particles of silver reduced by gallic acid from the solution of silver. By this means the basis of a scientific explanation of the photographic process was furnished. Hardwich, Monckhoven, Davanne, and others carried Schnauss's explanation still further. They proved that the picture did not make is appearance upon an exposed film of pure iodide or bromide of silver, by the action of pyrogallic acid or sulphate of iron, but that it did appear when, besides the substances just mentioned, silver solution was applied to the plate* (Hardwich, Manual, p. 41; Davanne, Chimie Photogr. p. 82; Monckhoven, *loc. cit.*), and therefore explained the production of the photographic picture by a *molecular attraction* exerted by *insolated* iodide of silver upon the reduced particles of silver,—although they differed in opinion as the change which iodide of silver itself undergoes when exposed to the light. I have also made some experiments upon this subject, especially with the object of ascertaining more accurately the condition in which silver separates in the reduction of its salts in the humid way. I ascertained that silver is produced by this means in two varieties:—†

1. As a coherent speculum, which deposites itself on the walls of the glass vessel as the reduction takes place.

2. As a grey or black powder, which appears under the microscope either as a regular arborescent crystallization, or as an aggregation of very fine granules of irregular form. I called the latter variety *granularly pulverulent* silver.

Such granularly pulverulent silver is produced, for example, by itself when a solution of sulphate of iron or pyrogallic acid is mixed with a solution of silver, and simultaneously with a silver speculum during the reduction of an ammoniacal solution of silver by tartaric acid or sugar of milk. I ascertained that the granularly pulverulent silver, in the act of separation, has a great tendency to deposit itself on rough spots in the glass, and that in this way, during the silvering of mirrors by means of tartaric acid or sugar of milk and a solution of silver, it caused the formation of spots, and thus became an injurious subsidiary product in that operation.

The reverse is the case in photography. Here it is an important primary product, as by its deposition on the parts of the film of iodide of silver affected by light it causes the appearance of the picture. "Photography and the silvering of mirrors are, in a certain degree, similar arts, both depending on the reduction of silver salts to metallic silver. In coating mirrors the object is to produce a *uniform* precipitate of specular silver, and to avoid as much as possible the precipitation of the granularly pulverulent form; in photography, on the contrary, we seek to produce upon the exposed plate an *unequal* precipitate of granularly pulverulent silver, in accordance with the illumination." That the black substance which forms the photographic negative is really metallic silver may be proved at once by pressure, or rubbing with the finger-nail or a glass rod; by this means it is rendered white and silvery.

From these investigations it is sufficiently demonstrated that the sensitive film acquires, by insulation, the property of attracting and retaining nascent granularly pulverulent silver; but as to the cause of this singular property opinions are divided.

Davanne maintains that this property of exposed iodide of silver depends on its being decomposed into iodine and silver, and the silver thus set free having an attractive action upon the particles of silver in the developing fluid. He founds this opinion upon an experiment of Young. Young exposed a plate with albumenized iodide of silver in the camera, dissolved *all* the iodide by means of hyposulphite of soda, and then treated the plate with the developing fluid. *Although all* the iodide of silver was removed, this still caused the appearance of a picture; but if the plate was previously treated with nitric acid, no picture appeared. Davanne explains this phenomenon by the setting free of silver during the insulation of the iodide. This silver remains, according to him, after treatment with hyposulphite of soda, and serves for the production of a picture (Barreswille and Davanne, *Chimie Photogr.* p. 82).

(*To be continued.*)

* This silver solution, however, need not, as in Schnauss's experiment, be upon the plate *during* its exposure.

† Bericht der Berl. Akad. der Wiss., May 22, 1862; also Poggendorff's "Annalen," cxvii. p. 316.

LIGHTS AND SHADOWS IN A PICTURE—THEIR USE AND VALUE.*

Although persons ignorant of artistic effect may find fault with the most effectively-disposed lights and shadows, I would yet counsel every heliographer to give his productions the highest possible artistic value. This he should do, not alone for his own reputation, but for the honour of his art and its professors.

If insensible to these motives, he may well doubt his possession of the qualities indispensable to his profession. At all events, a skilful, delicate use of lights and shadows is essential to the production of those heads truthfully modelled and well "rounded up," which can win for their author the proud title of artist.

"Do architects," queries Sir Charles Bell, "while arranging the masses of their buildings for effect, study enough how the shadows will fall?"

It seems, then, that even in a structure of wood or stone, care should be used that the shadows shall be cast so as to secure an aspect of appropriateness and beauty; and that without such care all labours else are comparatively futile.

How noble an expression may be stamped upon an edifice by managing this department skilfully, is shown in the Parisian palace of the Louvre, and in Oxford, Cambridge, and other colleges and buildings in England, of which excellent photographs are frequently to be met with. There are also many other heliographs of noble specimens of architecture, effectively taken by experienced and genuine artists.

If, then, light and shadow be essential to the artistic excellence of a building, how much more so to the perfect image of the human face and figure?

Wherever there is bright light, shadows are of extraordinary prominence and importance—and this is alike in nature and in art, the transcript of nature. Commonly, indeed, shadows are more conspicuous than the objects that produce them. For, while equally large with these objects, they are darker than their darkest parts, since the aspect of the objects is modified both by direct and by reflected lights. Their broad, equable spaces, therefore, strongly impress the eye; especially as their outlines are defined by lines sharper than Nature ever uses in defining objects themselves.

Hold some small object above a piece of white paper in bright sunshine, and you may note two things—first, that the object shows a soft outline, while the shadow exhibits a sharp, decisive edge; and, second, that the shadow is of a very much darker hue than the object. An eminent art-critic affirms that such a shadow will be three-fold darker than a piece of black cloth laid in the light.

In a landscape, then, on a clear, sunshiny day, the shadows are actually the most conspicuous things next to the strongest lights. In fact, it is chiefly by them that what forms, and especially the peculiarities of forms, *are*, is perceived. For instance, the roughness of the bark of a tree can be seen neither in light nor in shade, but is defined by the shadows of its ridges. To represent vivid light, therefore, we must first get sharp, visible shadows.

Again, in Nature, the intensest lights and darkest shadows are always sparingly employed; and this invariably in points, and never in masses. If the light be in a large mass, it is *subdued;* and the shadow, if broad, is feeble. The interval between such contrasted light and shadow is occupied by middle tints and pale grays. Into this scene Nature introduces here and there a spot of high light, and here and there one of intense gloom; the effect of which is to vivify the whole. Her invariable rule, then, would seem to be to furnish the amount of deepest shadow as of intensest light, and neither more nor less—points of each answering to those of the other, and both showing vividly out from the rest of the landscape.

Such is Nature's method of managing light and shadow; and herein the artist has a model which he should strive, to the extent of his ability, to copy. Masses of diffused, soft light, balanced by masses of expanded, mild shadow; the space betwixt the two filled by carefully graduated middle tints; while here and there, a keen, bright spot of light is set off by equivalent spots of deep shadow—*here* is the programme which the wielders of the pencil and the camera should alike endeavour to conform to; and the nigher they approach it, the more do they exhibit the genius and executive skill of the artist.

It is impossible, on paper, to tell the heliographer *how* he can make his one simple instrument execute a work so complex and delicate. But if he have the eye of genius, there need but industry and perseverance in observing and experimenting to discover the *modus operandi*—besides that, he may be essentially aided by an accomplished artist handling the camera before his eyes.

What we call "relief," *i. e.*, the apparent *standing out* of the object from its ground, is effected by the *contrasting* of light and shadow. So, would you produce breadth and splendour of effect, join together masses of light objects, and corresponding masses of dark objects. Again, to get harmony and softness, sink some objects wholly or partially in shadow, and let their outlines be insensibly lost in the ground. Finally, to create vivacity and spirit, make, in some parts of the picture, abrupt breaks and sharp transitions.

* From "The Camera and the Pencil" by M. A. Root.

THE SCIENCE OF A RAY OF LIGHT.*

As yet the attention of the student in this branch of natural science has been directed only to reflections of light from plane surfaces. The same laws, however, prevail in reference to curved as well as plain surfaces, the apparent differences being those of result, and not of principle.

The curves with which we are most familiar are those of of the circle, the common parabola, the ellipse, and the hyperbola. For optical purposes, practically considered, the spherical surface, or that generated by the revolution of a semi-circle around its diameter, is the only curved surface in use; for the difficulty of preparing the other curves with sufficient accuracy has precluded their general application, where, if the difficulty did not exist, they would be universally met with.

If it were possible and easy to grind and polish a paraboloid (the curved surface generated by the revolution of a semi-parabola around its axis), then the paraboloid would be used by photographers, instead of a combination of lenses, in the preparation of landscapes, and for this reason: the views thus reproduced (of distant objects especially) would be free *certainly* from all chromatic aberration, and also in a great measure from spherical aberration. For it is the property of the paraboloid to reflect all *parallel* rays to one and the same focus; and the rays from distant objects are so nearly parallel as not to deviate much from the theoretical result. For astronomical purposes, naturally, such a reflecting surface would be invaluable, the sun, the moon, and the planets being so very remote as to produce only parallel beams of light. But, as before remarked, there *is* great difficulty in grinding and polishing such surfaces, and so great indeed as to permit the expression of its impossibility.

The inquiring student may be curious to know what a parabola is. Take a cone, it is immaterial how high, in comparison with its base, or how low. Such a cone may be cut out of a piece of potato or apple, or turned in a lathe out of a piece of wood. If the cone be made of potato, the student may, with a sharp knife, easily cut a slice from this cone in any direction required. If the slice be directly from the apex and perpendicular to the base, the two slices will be equal in size, and the inner surfaces will be triangles. If the slice be parallel with the base, the two inner surfaces will be

(Continued from p. 368).

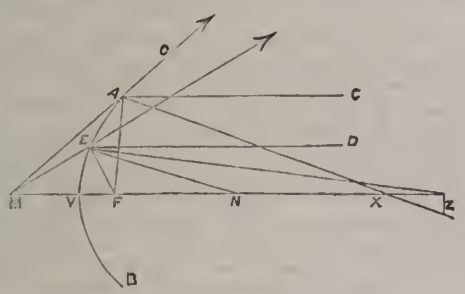
equal circles, the axis of the cone passing through their centres. But if the slice be neither parallel with the base nor perpendicular to it, nor parallel with the side of the cone, the surface of the section will represent an ellipse. Again, if the section be parallel with the side of the cone, the exposed surfaces of the two slices exhibit parabola; and a section parallel with the axis, but not through the axis, presents two surfaces denominated hyperbolas. The sections of a cone, made by cutting it at an angle greater than that which its side makes with the base, will all be hyperbolas.

A line perpendicular to the straight line of the base, in its middle, of the parabola or of the hyperbola, is denominated its axis. The ellipse has two axes, the longest and the shortest line that can be drawn across the surface. The diameter of a circle is its axis.

If a semi-circle, a semi-ellipse, a semi-parabola, or a semi-hyperbola, in the form of a piece of wire, be made to revolve each on its respective axis, it would form or describe in space respectively a spheroid, an ellipsoid, a paraboloid, or a hyperboloid. Each of these bodies, whether concave or convex, if accurately made and thoroughly polished, give rise to curved surfaces that reflect light in a way peculiar to each figure, and which it now becomes our duty to analyze for the benefit of photographers.

Now, if you want to increase your knowledge in this interesting branch of science, on which photography so much depends, begin earnestly, fetch a potato, cut it into the form of a cone, and then make yourselves familiar with the figures above described. Now, although you will not be able to distinguish a parabola from a hyperbola, we here tell you that they are endowed with characteristics which render them quite distinct. We may not enter into these differences further than to mention the optical results from each curved surface, because, to understand them, requires an amount of mathematical education which you are not expected to have enjoyed; but the results you can learn and appreciate.

Suppose we have, then, a curved surface, well polished, in the form of a wash-bowl, and made of silver, steel, or what is called speculum metal, which is an alloy of 29 parts of tin, 64 parts of copper, and a small quantity of arsenic or zinc. In lieu of a metallic speculum, a concave glass mirror covered with mercury may subserve the purpose of illustration. Furthermore, let a A V D represent a section of the mirror, V X its axis, C A, E D, parallel rays, as from the sun, moon, or a distant object. F is the position of a radiant, or a bright luminous point, from which rays proceed in all directions. It is intended to show the properties of the spheroid, paraboloid, ellipsoid, and hyperboloid by means of this figure.



Let F E and F A be two rays from the luminous point impinging on the surface A V B; they will be reflected from this surface according to the ordinary laws of reflection; and the directions of the reflected rays will indicate distinctly the nature of the curve; thus:

1. If the reflected rays proceed parallel with the axis, as in the directions respectively of E D and A C, the curve is a parabola and the mirror is a paraboloid.

2. If, after impact, the two rays take the directions of the two arrows as proceeding both from the point M, as M E and M A, the curve is a hyperbola and the mirror is a hyperboloid.

3. Supposing, in the third place, the two rays, after reflection, proceed respectively to the point N on the axis; this fact demonstrates quite clearly that the curve is elliptical and the mirror an ellipsoid.

4. Lastly, if the reflected rays cross each other, in the point O, before they reach the axis, as the ray A X and the ray E Z, then the conclusion is derived that the curve is a circle and the surface is spherical.

From this concatenation of optical properties, the special characteristics of each of the reflecting surfaces can be seen and understood at a glance.

Let it be remarked, however, here, that if the distance from A to B comprehend only 4 or 5 degrees of the arc of a circle, the four curved surfaces will be equivalent, or nearly so. By this is meant, that a spherical surface, &c., is paraboloidal, &c., as long as it comprehends only the number of degrees just mentioned. Now, get a correct idea, before you proceed any further, of the meaning of the *angular opening of the mirror*. Take a globe, and lap a thread around its middle so as to meet the point of beginning. Divide the thread into 360 parts, and mark off, for instance, ten of these parts on the surface of the globe in the same direction. With a pair of compasses, opened so as to take in five of these spaces, and with one foot placed at the beginning of the sixth space, draw a circle on the globe. Suppose now, this globe were of polished speculum metal, and a piece were cut out of the size marked by the circle, this piece would represent a reflecting mirror of *ten degrees aperture*. A larger circle on the same globe would comprehend more angular space; and thus half a globe comprehends an opening, a concavity of 180 degrees.

The point F in the figure, the position of the radiant, is denominated the *focus* from the following circumstance place a polished paraboloid in front of the sun; all the parallel rays that impinge upon its surface will, after reflection, tend to the point F, and be all concentrated in that point, so that the heat which light invariably contains, is, likewise, all concentrated in this point. The amount of heat thus collected on so small a space is so intense as to set fire to any combustible substance, and to fuse the most refractory; it forms what is called the *burning point*, the *fireplace*; in fine, in Latin, the *focus*.

No other curve is endowed with this property of concentrating parallel rays to the same extent as the paraboloid. As before observed, if the angular opening of the mirror be small, then a spherical mirror does not deviate materially from that of the paraboloid, and consequently, causes parallel rays to converge to the same point nearly. But the focus of a beam, or of a pencil of light, is not only a burning point, it is in like manner a picture-point; it is, in fact, the position of the luminous reproduction of the radiant from which the light emanated.

It will be seen, therefore, that the *sharpness* of the picture will depend upon the *accuracy* with which all the rays that proceed from each point of the object are converged to a single point; and, secondly, that the quickness of the actinic effect will depend upon the *quantity* of rays converged to a single point.

From those two facts, it is evident that the paraboloid is endowed with the requisite optical conformation in order to produce a sharply defined picture, and to produce the effect with more rapidity than can be produced by any other known means; for the angular opening of the mirror can be increased without any deterioration of sharp definition, and with a corresponding increase of light.

It is, therefore, much to be regretted, that no means as yet can easily produce highly-polished and accurately-formed paraboloidal surfaces.

Notwithstanding this, mirrors are ground and polished for astronomical purposes as near to the paraboloidal curve as it is possible, and then limited in aperture afterwards, so as to deviate as little as possible from the results produced by such a curve.

The ellipsoidal mirror is peculiarly adapted for taking

very sharp pictures of *near* objects, which are placed in one focus, as for instance F, whilst their pictures are represented to the other focus N. The sharpness of the picture and the rapidity of the actinic action depend in this form of curve on the same conditions as in the paraboloid.

The hyperboloidal mirror is well adapted for illuminating a large surface, the light being placed in the focus; because such a mirror renders a divergent pencil more divergent. The paraboloidal mirror is well adapted for illuminating long spaces in front of it, as railroad tracks, because its reflected beam consists of parallel rays.

The spherical mirror has, in fact, no definite character but that of spherical aberration—it is a sort of mongrel or cross breed between the three curved surfaces above-mentioned. The nearer it approaches the shape of the elliposoid, the more accurate is the definition of the object in the picture at the conjugate focus; and the nearer it approaches the paraboloid, the better adapted is the spherical mirror for astronomical purposes.

Let Z be the focus of parallel rays of the curved surface AVB regarded as spherical, and AB the amount of opening, then ZP would measure half the amount of the *lateral spherical aberration* of the mirror, and XZ would represent half the amount of the *longitudinal spherical aberration.*

This subject of aberration is so important that its further discussion will be postponed for a future lesson.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, July 27th, 1864.

M. Laulerne, the Secretary of the Photographic Society observed, that among the special correspondence of the Society were a great number of letters complaining strongly of the bad quality of positive paper now met with. He added, that the administrative committee believed it to be their duty to call the attention of the society to this subject The President observed that this was a matter of great importance; doubtless, the interest in the question is not so great now as it was when negative paper had to be manufactured, requiring its pulp to fulfil certain conditions; but, it is still of sufficient importance to demand the attention of a special committee.

M. Aimé Girard stated that, like many others, M. Davanne and himself had in the course of their researches upon positive pictures met with papers of detestable quality, but they had also met with others that were very good. The question of paper must be seriously studied, but before all things, it must be clearly stated. According to M. Girard, the sheet of paper goes for very little in the formation of positive proofs, as obtained at the present day. The generality, if not the whole of the photographers, operate now upon albumenized paper. Now, experience has shown that the picture is entirely fixed in the coating of albumen, when the latter is sufficiently thick, and does not touch the paper.* We may refer to the interesting experiment made by M. Terreil in the presence of the Society, which consisted in submitting an albumen proof to the action of sulphuric acid. Under this influence the paper becomes parchmentized, the albumen remaining unchanged, and after immersing the whole in water, it becomes extremely easy to separate the coating of albumen completely from the paper, in this case the entire picture is carried off in the albumen, and the paper remains absolutely white.

If, therefore, it is the albumen alone that concurs in the formation of the picture, and if the sheet of paper remains independent of this formation, it is quite evident that the nature of the paper which serves as the vehicle is a matter of indifference, and that all our attention must be given to the additional sizing.

Some operators, deterred by certain failures, reject albumen as constituting a bad sizing. This is an error, the albumen is not normally bad; when a sizing of this kind is well prepared we can obtain beautiful proofs, quite permanent, and with the whites perfectly pure. But so many circumstances may change the quality of the albumen, that it is easy to understand the failures to which this sizing frequently exposes us. Formerly, every photographer prepared his own albumenized paper; now it has become a special manufacture, and perhaps the same care in its preparation is not given as in the amateur's operating room. A bad egg serves to vitiate an important preparation; the state of the acidity or alkalinity of the chlorides employed, and of the albumen itself has a very sensible influence upon the conditions of toning. Thus, M. Girard thinks that it is chiefly to the study of the additional sizing furnished either by albumen or gelatine, that a committee should give its attention.

M. Rolloy added, that he still considered it useful to study the paper question, apart from the additional sizings: for on some papers a multitude of little greasy spots are observeable, which are certainly due to the original sizing in the vat.

M. Bertsch thought that the defect pointed out by M. Rolloy was due to the employment of resins of bad quality. Since the civil war in America, paper makers were compelled to employ Bourdeaux resin exclusively, which gave only bad results. He believed, moreover, that preference must be given to non-albumenized paper for positive pictures. He also considered it important to study the paper itself, apart from all additional sizing. We have begun, added Mr. Bertsch, to make some interesting experiments upon enlarged pictures, and it is indispensable in pursuing these experiments to have very good paper at our disposal.

The President said that it was certain that the conditions of the manufacture of photographic paper were now completely changed; albumen paper is employed almost exclusively, and with this paper the additional sizing plays the principal part. But it is interesting to enquire if it would not be preferable to prepare positive proofs with such papers as will receive the picture, not on its surface, but in the pulp of the paper itself. By employing thick papers, thoroughly penetrated with the chemical agents, we may obtain pictures more solid and permanent. On this subject, the President remembered the time when negatives on paper were in vogue, that he had prepared some very thick Canson's paper, and that he thoroughly impregnated these papers under the air pump, and obtained very excellent results.

Besides, added the President, the Society appointed many years ago a committee to study the paper question. This committee has not been able to work usefully up to the present time, because it is very difficult to exercise any influence upon paper makers. But the question is now put with greater clearness than before, and there will evidently be some interest in submitting to the committee the various points now dwelt upon. The Secretary remarked that owing to various causes, a certain number of the members of this committee could not serve at the present day, and that it would be necessary to replace them by others.

NATURE OF LIGHT.

Sir,—I was much pleased with the researches of Professor Heinrichs on the spectra of the different metals, and have great hopes that such investigations will lead to the discovery of the form and dimensions of the different atoms of elementary matter; but I cannot understand what is meant by "the element of the elements;" if by such a term is intended that all the different forms of matter spring from one simple element, I think (although far from saying that such may not be actually the case) it is quite beyond our power to demonstrate such a fact, for the simple reason that

* This is entirely opposed to the results of our own experiments, in which after removing the albumen film containing an image, we found a strongly printed image underneath upon the paper itself.—Ed. Photographic News.

the power (the attractive force of cohesion) which gives to matter form, solidity, and weight, is itself not a simple but a compound fluid, and its antagonist is not sufficiently powerful to extricate matter so completely from its grasp as to exhibit it in its purely elementary form. A consideration of the cause of the atomic weight of matter will illustrate this, it is the difference in attractive power upon matter between the two primary forces of nature which constitutes weight. As the earth contains different elements of matter, a difference in attractive power between the two primary forces is perceptible in them, thus hydrogen is the lightest because the attractive power of the two primary forces is the most nearly balanced in this element of matter; atomic weight, therefore, depends upon the excess of attraction of one primary force over the other.

I would wish, in concluding this letter, to impress upon the consideration of our scientific men this one great truth, that all the natural phenomena we see around us are produced by the aid of matter; light, heat, sound, magnetism, galvanism, electricity, aye, even to our mortal life itself, cannot exist or be produced in the absence of matter, it is the indispensable requisite in the production of all around us. The sun, moon, and stars render themselves visible by the light they produce in our atmosphere; spectral analysis of that light is therefore valueless, when we attempt to judge from such experiments of the nature and composition of such bodies, as we are merely examining the effects of different actions on the matter composing the world we live in.—I am, sir, respectfully yours, T. A.

Yarmouth, August 1st, 1864.

PATENT SUN BLINDS.

Sir,—The letter of Mr. McLachlan in reply to my own is precisely what might be expected from him. As I am not accustomed to make "wilful mis-statements," I shall be glad if you will publish the following in proof of my former remarks.

The demand for the £5 was made on the 9th ult., as stated, and I returned the bill on the same day by the boy who delivered it to me, and wrote to Mr. McLachlan to the effect that I did not consider myself indebted to him On the 12th I received the following letter:—

Mr. McLachlan is sorry that Mr. Brothers repudiates Mr. McLachlan's claim to originality in the patent sun blinds, and is surprised at having the account returned. Mr. McLachlan writes to explain the charge made for royalty; £5 gives Mr. Brothers the privilege of using the blinds as long as he wishes; and wishing to avoid anything disagreeable, Mr. McLachlan encloses his account herein, at the same time giving Mr. Brothers notice that unless it be paid on or before Friday next (15th July), the matter will be placed in the hands of his solicitor.

On the 14th, I wrote for the name of Mr. McLachlan's solicitor, intending to pay the money under protest; and I wrote again on the 15th, stating that my blinds were like others which had been in use several years, and that I should have proof of my assertion in a day or two, but instead of waiting the time named, the matter was at once placed in the lawyer's hands, who gave me notice to pay the money on the 16th before 12 o'clock, with 10s. 6d. for his costs, and that unless the demand was met an action would at once be commenced.

This, then, is the extent of my "wilful mis-statements." Could the notice to pay the money have been shorter? It is true I did pay the money and sign a sort of agreement, and why did I do so? The alternative given by the lawyer was, "Mr. Brothers can pay the money and *take down the blinds*, or sign the paper and use them." Should not I have been thought foolish to part with my money and debar myself the right of using the so-called patent blinds? I was informed on good authority that a protest under the circumstances would have been useless; it was evident the money must be paid or I must risk an action at law, and I took the shortest course, at the same time I considered the demand the most unjust I had ever heard of.

You will see, then, that there is no "reverse" to what my former letter contained, but the facts tell as powerfully as ever. But that there is a "reverse" as to the validity of the patent, let the following letter tell, it is from a gentleman residing at Clifton, who says:—

Previously to coming into this house, a year ago, I had a due south light, and such curtains hung from my roof for six years.

And he offers a subscription if law proceedings are commenced against any one using the blinds. Another gentleman writes:—

I think every photographer must hold that a gross imposition has been practised on you, and photographers will be *blind* to their own interests if they do not at once subscribe a sufficient sum to settle the question in a court of law.

And he also offers a subscription.

The case of the charge of £5 for using pieces of calico "hanging from the roof" was cited on sufficient authority, and needs no further remark from me.

As to the question, why I and others "worked at great inconvenience for some years, unable to keep out the sun," and only adopted the so-called patent blinds on the publication of Mr. McLachlan's paper, for myself I can reply, that I have frequently, and for many years past in one of my glass rooms, used blinds "hanging from the roof" for certain purposes; that I object to the unsightly appearance of the blinds in question; also, that I *now* use *my* blinds to a limited extent only, the rest of the glass roof is covered in the usual way with calico blinds, which can, of course, be drawn up when not required. I say *my* blinds, because I maintain they are not such as the patentee describes, and are not used for the same purpose. Probably, now that he has pocketed the £5, Mr. McLachlan thinks me a "simpleton" for having paid it. I am thankful for the compliment, but I am not quite the "simpleton" he takes me to be. I have not the same relish for law that he evidently possesses, or I should have followed my first inclination and have taken no notice of the letter or demand, and the case might then have drifted into a law suit. I had, however, to consider where the costs would come from in case I won the suit.

Mr. McLachlan very generously offers to return my £5, and *promises* to bring an action against me to test the validity of the patent. The case stands just as it did on the 16th ult., when the money was paid. If I had been disposed to act the Quixotic part of the photographers' champion, I might have had the honour of beating a patentee, and thus freeing them from the possibility of unjust claims for royalty, and I should have satisfied my own conscience in having done a right thing; but at a cost of time, patience, and money, which I felt, as I have before stated, I ought not to be expected *alone* to bear. This is my opinion still. It is true I do wish to form a league to get rid of an imposition, and to this end I will subscribe £10 to a fund for the purpose of resisting the next claim, should one ever be made.

I decline to become the defendant in an action as invited by Mr. McLachlan, for reasons which I need not further explain here, and for the same reasons I shall not feel myself called upon to reply to any further remarks he may choose to make. I have neither time nor inclination for a paper war.

After the statement quoted in this letter, that the so-called patent blinds have been in use at least six years, there is, perhaps, very little need of any further caution from me, and I am inclined to the opinion that the photographers may dare to risk the visits of Mr. McLachlan's spies. For my own part, I cannot understand why, if he knew I was using his patent nearly all last summer, Mr. McLachlan was so considerate as to allow me to do so without payment. I never made any secret of the matter that Mr. Beaumont had made the blinds, or of their failure, and the use of my improvement has been equally public. I believe the fact to be that *my* blinds are very much superior to those patented, at all events they are cheaper, about *one shilling* each blind being the entire cost, what the other kind cost I have never taken the trouble to enquire, but I know they are very expensive. The importance of the subject, will, perhaps, be sufficient apology for the length of this letter.—Yours obediently, A. Brothers.

Manchester, 1st. August, 1864.

Photographic Notes and Queries.

Acetate of Iron, Double Sulphate of Iron, and Potash.—Nitrate of Potash in Negative Bath, &c.

Sir,—I have just received the last vol. of the Photographic News (No. 7, of 1863), and observe that in some of your remarks on iron developers, you speak very disparagingly of the acetate

of iron developer. I have sent you by book post a packet of photographs as per list enclosed. I do not send them as specimens, as I believe they are far from, being fair prints, but merely to show what can be done with an iron developer. They were all developed with the following solution.

Protosulphate of iron	...	...	30	grains
Acetate of lead	...	...	12	,,
Glacial acetic acid	...	...	30	minims
Water ...	...	...	1½	ounce.

I dissolve the iron in 1 ounce of the water, and the lead in the remaining ½ ounce, adding the acetic acid to the latter before mixing. I may mention that I always prepare the solution in the morning before I begin work, as I find it will not bring out the details in dark places, if kept longer than a day. This appears to be contrary to the experience of some of your correspondents, who prefer keeping the iron developers some days before use. Probably the great heat out here has something to do with it.

The pictures are all by wet collodion. I worked in a small dark tent, in which it was so close and hot that I had to put my head out every now and then for fresh air. The lens was an orthoscopic, No. 2; I like the lens very well; it is advertised in the catalogue to cover a surface 15×11, but I found that it with difficulty covered a plate 12×10, and only gave a fair picture of that size under favourable circumstances. The smaller views were taken with a Ross actinic triplet, No. 1. The stereoscopic with Ross's instantaneous lenses.

I would like an opinion on the prints, but in judging them, you must make some allowance for the circumstances under which they were taken. It is neither pleasant nor easy to work wet collodion with a burning sun over your head, and the thermometer at 120°.

The toning is very poor, but I attribute this to the poor quality of the chloride of gold which I had. It is very difficult to procure this chemical of even decent purity. I got an excellent sample once from Lieut. Noverre, (who, I perceive, is a valued correspondent of yours), and he said it was from Bland and Co. I used phosphate of soda in the toning bath; I have not been able to try the lime toning baths yet, but I will give the lime a trial when I can get some. I tried a mixture of chloride of calcium and acetate of soda, but it toned very slowly, and I could not get a black colour with it.

About two years ago, I was working out of doors at some distance from home, when I happened to drop about two drachms of cyanide solution into my iron developer. I had just begun work, and had but one bottle of developer with me. So, not liking to shut up, I filtered the solution and tried it. I was surprised to find it gave excellent results, and I recollect that I kept the solution much longer on the plate without fogging, than I could have kept the simple iron developer. Since the double sulphate of iron and ammonia has been introduced, I have been trying again a mixture of iron and cyanide, and find I can attain good results with it. Is there a double salt of iron and potassium formed in the mixture? My knowledge of chemistry is very limited, but some of your correspondents may work out the idea with success. (2).

I have used the new iron and ammonia developer lately, but I cannot say I like it better than I do the proto acetate of iron solution, the formula for which I have given above. I should mention, that all the prints I send, without a single exception, have been printed from, without being touched up. Nor in a single instance has intensifying been resorted to; the sky has been stopped out in one or two, but this was done owing to stains in the upper part of the plate. This is the main difficulty I find with my developer during exposure, the silver drains to the bottom of the plate, and I invariably get stains in the sky; how can I remedy this? (3).

I have been experimenting with a negative bath, 15 grains of nitrate of silver; and 30 grains nitrate of potash to the ounce, (I had no nitrate of soda); on mixing the solutions a rather milky white precipitate fell to the bottom, which makes me think the nitrate of potash must have had a chloride or carbonate mixed with it; this I fancy reduced the strength of the silver still lower, and probably affected the working of the bath as well. (4). I acidified a bath of 8 ounces with one drop of dilute nitric acid. I got some negatives of a peculiar orange colour; they were remarkably clear, but appeared very weak by transmitted light. I did not pursue the experiment, nor did I print from the negative. I am sorry I did not print one or two copies, as it is possible the orange colour of the deposit may have made up for the apparent weakness of the picture. (5). If tried with pure nitrate of soda, better results would probably be got. I can only suggest this, as living in an out-of-the-way station, I cannot always procure chemicals to experiment with. I have never had a practical lesson in photography from any one. Your journal and Hardwich have been my principal instructors.—Yours faithfully, S. S. Corrigan.

Madhapoor.

[We do not recommend the use of acetate of iron, not because it does not at times give excellent results, but because it is unstable and uncertain. Our correspondents pictures are many of them very excellent, but we think he would have had fewer difficulties, and obtained more uniformly brilliant as well as delicate results, by using the developer employed by Mr. Vernon Heath, viz, 8 grains of protosulphate of iron, 20 minims of acetic acid, and 1 ounce of water. 2. A series of decompositions would take place, cyanogen combining with the iron, and potash with the sulphuric acid liberated. There is a double salt of iron and potash, as of iron and ammonia. Whether any difference in the developing power of the solution beyond weakening it, we cannot state. 3. The developer we have just given, will cause less tendency to stains than the one you use. 4. Nitrate of potash with a collodion containing iodide of potassium, and nitrate of soda, with a bath containing iodide of sodium, are generated in the bath, and do not apparently produce any injurious effect. Some French authorities have claimed advantages for nitrate of potash, but it appears uncertain. 5. We have occasionally seen negatives with the sky of a deep orange tint, which printed exceedingly well; but we cannot speak certainly of the conditions which produce them. We answer your other questions in answers to correspondents. —Ed.]

The Fluorides in Photography.

Sir,—In the early days of photography, we frequently heard allusions to fluoride of silver as one of the bodies which might be expected, from its nature, to play an important part in photography. A recent paragraph in one of the journals revives the subject in my mind, and leads me to ask the question, have any satisfactory experiments ever been made with this salt, and with what results? The paragraph in question, which appears to be an answer to an inquiry similar to this, intimates that the Editor is not aware of any systematic experiments on the subject, but gives the following formula for an iodizing solution, as one published, but not recommended, by the late Mr. Archer:—

Alcohol	...	...	1½	drachm
Iodide of potassium	...	...	2½	grains
Fluoride of do.	...	...	1	grain
Bromide of do.	...	...	½	,,

Can you tell me what would be the effect of the fluoride in collodion, and would it increase its tendency to become alkaline? Would it be likely to increase sensitiveness, or density, or give other good qualities? You have always been the staunch advocate of the bromides, but I do not remember that you have written anything on the fluorides. Please enlighten me, and add one more to the many favours you have conferred on photographers generally, and especially on yours very gratefully,

Beta.

[The use of the fluorides in photography was first suggested by Sir J. Herschell, and Mr. Hunt subsequently made some experiments with them, which are recorded in his "Researches on Light," but as he seemed to have some misconception as to the physical nature of the salts, much of the value of the experiments is vitiated. Some of Mr. Hunt's experiments suggest that a combination of fluorine, bromine and silver was extremely sensitive, and a preparation of fluoride of silver, when submitted to the solar spectrum, gave an image with some indications of the natural colours. Some other experimentalists have worked with fluoride of silver, but no results of practical value have been obtained.

The formula quoted from Archer by our contemporary is scarcely likely to have been tried by either, inasmuch as fluoride of potassium is not soluble in alcohol, and could not be used in collodion. Fluoride of sodium might be dissolved in collodion in small quantities, but as fluoride of silver, when formed, is soluble in water and nitrate solution, instead of remaining in the film, as the insoluble iodide and bromide of silver do, it would be dissolved out into the bath, and would not be likely to have much influence on the negative in any way.—Ed.]

Spots on Albumen Prints after Washing.

Sir,—I think the instance given by you in your notice subjoining Mr. Fitt's letter in last Friday's "News," with regard to the "spots" complained of by him, to be the cause; for example, I have met with similar results upon two occasions, viz., we wash our prints in a large pan placed under a tap on a shelf; the water runs off by means of a tube of gutta percha into a sink below; once we found some of the prints (but not all) covered with spots as described by Mr. Fitt, the cause of which was, that the assistants and boys had been washing themselves in the sink, and thus splashed the prints in the pan with soap. Again, we had a number of whole-plate, and half-plate pictures (unmounted) pinned up to dry, which were covered with small spots also, but which were perfectly free from them when taken from the water; it was then discovered that a boy had been requested to clean the dressing-room hair brushes, and he had done so, with soda and water, &c., close by where the prints were hanging, and thus splashed them. Of course I cannot say whether something similar is the cause of the spots in Mr. Fitt's prints, perhaps it may be in the paper, as many complaints of "blisters, &c.," have appeared in your useful and valuable journal lately.—I remain, sir, yours respectfully.

Brighton. David Duncan.

Detaining Specimens.

Sir,—Having observed an advertisement in your paper of the week before last, which stated that "A young lady able to print, mount, and touch, was required immediately, and that a competent person might send carte and references to Zeta, Post Office, Stanmore, N.W." I was induced to answer it. Relying on the gentleman's promise to return the carte, I sent one, but never received any reply, although I have since written twice, enclosing stamped directed envelope, so that he has not the excuse of a lost address. This is not carelessness, it is dishonesty. I have no doubt that mine is not the only carte he has succeeded in obtaining, and as he shelters himself under a fancy name at a post office, one has no redress, and in addition, there is the unpleasant thought that your portrait, name, residence, &c., are in the hands of a person whose conduct would certainly not create a favourable impression as to the use he might make of them.

Apologising for troubling you, which I have done in the hope that if I cannot obtain mine, a few lines in your valuable journal will at least prevent Zeta's getting any more cartes,—I am, yours truly, E. H.

July 27th 1864.

[We once more insert a letter on this subject in the hope that the remonstrance may meet the eyes of those who are guilty of the careless and cruel retention of specimens forwarded to them in good faith that they will be returned.—Ed.]

Talk in the Studio.

New Photometer.—We understand from Mr. Swan, who is not idle in perfecting his carbon process, that he has just satisfactorily completed a photometer, by the aid of which, all uncertainty as to the time of exposure in carbon printing may be entirely done away with.

Keeping Toning Solutions.—A few days ago we had an opportunity of testing the keeping properties of the toning bath of acetate of soda and chloride of gold. In some recent printing experiments, we employed a solution which had been mixed nearly twelve months. It toned perfectly, and worked as well in all respects as it did the same week in which it was prepared.

Distinguished Patronage for Photography.—Photographers, of all men, ought to be loyal; for much of the existing rage for the art is doubtless due to the patronage it has received from the reigning family, who set an admirable example to their subjects, by frequently having their portraits taken. Mr. Jabez Hughes has just had the honour of photographing, by command, her Majesty the Queen; their Royal Highnesses the Prince of Wales, the baby prince, Albert Victor, the Princess Louis, of Hesse, and the baby princess, her child; the Princess Beatrice; and the Prince William of Prussia; and obtained, we understand, many successful groups, especially of the Queen, surrounded by her grandchildren.

Our Juvenile Premier.—We understand that Lord Palmerston, who is about to give a grateful country fresh opportunities of possessing his portrait, sat, on Tuesday, at the Regent Street studio of the London Stereoscopic Company, for not less than four dozen negatives, and not a single movement occurred in any of them! This, to his lordship's admirers, will be satisfactory evidence of his vigorous health and fine condition at the end of the Parliamentary session.

Photographic Piracies in Guernsey.—The channel islands are somewhat singular as belonging to the British dominions and being within a few hours sail of our own coast, without being subject to British laws, unless an express be made to include them within the operations of each new Act passed. It so happens that as yet the provisions of the new copyright Act have not been extended to Guernsey, and we find that photographic piracy is, accordingly, rife there. In the absence of legal penalties, however, the members of this little community contrive to punish and check misdemeanours socially, if they cannot suppress them by law, and we find, in the *Guernsey Star*, a number of letters holding up to public reprobation the conduct of a Mr. Barbet for pirating, and selling, at a low price, the original photographs of Mr. Hutton, a clever photographer in the island. This kind of lynch law would scarcely answer, we fear, amongst larger communities, and might possibly lead to law proceedings of another kind, but we hope they will be successful here in suppressing the mean practice at which they are aimed.

Art under Difficulties.—One of the greatest curiosities of the Louvre at the present moment is the sight of an artist born without hands or arms, copying the works of the great masters, and copying them with great success. The way in which he has tutored his feet to the work is so extraordinary that on looking at him one can scarcely divest oneself of the feeling that nature, by way of compensation for the absence of the upper limbs, must have furnished the lower with muscles and nerves of unusual power and delicacy. The name of this artist is Felu: he is Belgian by birth, and has studied in the Academy of Antwerp, which he entered in 1859. His application for admission at once secured the attention of the director, M. De Keyser, by the great beauty of the penmanship, and when it was found that the pen had been held between the toes instead of the fingers, the surprise was great. He was immediately admitted into the classes, made rapid progress, and exhibited remarkable ability. But even more extraordinary than a painter without hands is a sculptor without eyes; M. Vidal, well known for some years in Paris, and who has produced some extremely clever models of animals in terra-cotta, is completely sightless, yet such is the perfection to which he has educated the sense of touch, that he models both with accuracy and facility. The preliminary study must have been long and laborious, especially if, as we believe, M. Vidal was born blind, or lost his sight at an early age.

Artificial Ivory.—The possibility of procuring a substitute for ebony and ivory has become an important question, now these materials command such extravagant prices. M. Ghoulston Ghislain has brought before the French Academy a substance which he asserts answers this purpose completely. He produced it by the following method:—Take 60 per cent. of the powder of marine plants, 15 per cent. of glue, and an equal quantity of coal tar; boil till thoroughly mixed; dry in an oven at a temperature of 300° Fah. till it becomes plastic. The compound will assume the appearance of ivory by heating it in an aqueous solution of caustic potash, and letting it macerate for several hours in diluted sulphuric acid; after which subject it to the action of chlorine or chloride of lime, repeating the operation till it becomes perfectly white.—*Scientific American.*

Photographic Exhibition.—The Photographic Exhibition we understand, will close on the 6th of August, and not on the 14th, as previously announced.

On the Removal of Stains from Silk.—A correspondent of the *Pharmaceutical Journal* writes:—"Being anxious to discover some means by which the colour could be restored that had been extracted from a violet silk dress by acid-juice having been accidentally thrown upon it, I applied to more than one chemist and druggist, thinking there must be some chemical agent which would restore violet, as spirit of hartshorn, it is

well known, will restore black. Not being able to obtain any information on the subject, I thought of trying some experiments for myself; the first, proving successful, may be worth recording, if only to amuse the more learned with an account of the simple attempts of an amateur. Having recently superintended the 'iodine process' for annihilating a blot of marking-ink from linen, it occurred to me to try it on violet silk; the plan I adopted is as follows, and will serve as a recipe:—Brush the portion of fabric with tincture of iodine; then, after a few seconds, well saturated the spot with a solution of hyposulphate of soda, and dry gradually; the colour is perfectly restored, and I consider my experiment highly satisfactory. I should have stated that it was knowing something of the chemical composition and properties of iodine that induced me to make the experiment which I have described."

To Correspondents.

Lost One.—The exact distance required between sitter and lens entirely depends upon the focus of the lens, and the exact size of image required, and as you do not furnish either of these data we cannot answer your question. The information would not, however, have been of the service you imagine. You seem to think that the absence of perfect definition in your picture may be due to the distance not being quite right. Unless you were about the right distance from your sitter you would not get an approximation to a focus. The imperfect definition may arise from the lens being defective; from your not being careful to get a sharp image on the ground glass; from the sitter moving, or from the camera not being true, that is, the ground glass and the sensitive plate not occupying exactly the same position. The want of half-tone is due to a little under-exposure and over-development. The collodion setting in ridges may be due to a little want of skill in manipulating, or it may be that the ether has evaporated during the hot weather, and left the collodion too thick for convenient use; in which case you may either dilute it with some new thin collodion, or with a little pure ether. You need not apologize for troubling us. We have pleasure in helping our readers, and it is an important part of the duty we impose on ourselves to do so.

Sr. John.—So far as we know the collodion you are using is as good as any in the market. 2. It is bromo-iodized. 3. Sealing wax containing either red lead, or vermillion, which is a salt of mereury, may possibly injure the negative bath; but is probable that being insulated by the shellac it may not produce any action. 4. Acetate of iron developer is very unstable and uncertain. 5. The double sulphate of iron and ammonia in crystals, if preserved with moderate care, will keep indefinitely. The solution if well corked it will keep a long time. 6. The reason why a developer flows evenly with plates excited in one nitrate bath and not with another is, that one bath, probably, contains more alcohol and ether, acquired from coated plates, than the other. With an old nitrate bath containing alcohol, the developer requires a little alcohol, and with a new bath free from alcohol, no alcohol is necessary in the developer. 7. If an iodizing solution be prepared of such strength that one part to three of plain collodion gives the right proportion, then adding more than that will probably over-iodize the collodion, and the result will be streaks and stains. We do not quite understand what you mean by black and blue films. A creamy film is generally obtained with a full bodied and fully iodized collodion.

J. S.—No. 1 or No. 3; probably No. 1 will be most certain. 2. The prices of lenses are largely regulated by the diameters of the glasses, those of large diameter, costing, as a rule, more than those of small diameter. The lenses of which you speak follow this rule. 3. Turmeric paper is used to test solutions for alkalinity. Its yellow colour is turned brown by alkalies. Red litmus paper, which is simply blue litmus paper turned red by being submitted to acid fumes, will recover its blue colour from the evaporation of the acid, unless it is kept in a well-corked bottle. 4. The only evil to be apprehended, as a general rule, by too long continued application of an iron developer is fogging of the shadows. In some conditions, it might also cause over-intensity; but, as a rule, when things are in good condition there is no danger in applying the iron solution, as long as it produces any action. 5. Waterhouse diaphragms are those placed between the front and back lenses of a portrait combination. That position has some advantages as you will see if you read our articles on stops carefully. 6. The plan of producing a reduced image you name, would be a little uncertain if a perfect and delicate image, and one which would bear magnifying, were required. 7. The plan of producing an image by means of a pinhole would, of course, be a test of the perspective effect, but would be difficult to effect on account of the long exposure necessary. 8. Solutions of gold should not stand in the light, as it tends to reduce them. The purple tint of which you speak is simply reduced gold.

Truth.—The lighting of the pictures you enclose is very good. The long exposure necessary is, doubtless, due to the proximity of the adjoining houses, which obstruct much of your light, and we don't see any remedy for that. 2. If you use a toning bath over and over, merely strengthening by adding gold, you are altering its constitution continually, and are almost certain to get mealiness. The solution of chloride of gold you add is probably slightly acid, and this would cause mealiness. The proper plan is to strengthen by adding more of a strong toning solution made as at first, but with less water. 3 All the solutions which contain silver are worth saving, but you must not add fixing solutions to washing waters, as the silver they contain cannot be thrown down as a chloride by salt. The plan for the fixing solutions, &c., is to precipitate as a sulphide, as described in our Year Book. 4. The New River water may be used for most photographic purposes, except making baths. We fear that we cannot help you further regarding your specimens.

Inquirer no asks: "Can a photographer not having plate licence, procure for his portraits gold lockets or brooches, without incurring any legal responsibility, providing he has the order for setting in gold, and having got the same, failing to obtain the money, can he proceed for recovery in the county court, without being floored on that plea." The question is really one for a lawyer, and we do not feel competent to answer it with any exactitude. But we should imagine that if the photographer merely acted as the agent in ordering it for his customer, he would not need a licence. How he would fare in the county court we cannot even suggest: much would probably depend on the character of the judge. What can more aptly illustrate the glorious uncertainty of the law, than a recent decision in the House of Lords, the very highest court of appeal, in which two of the judges hold one opinion and three another, the three of course carrying the day.

J. S. S.—If the originality of your apparatus consist simply in the shape or configuration, you can protect it for three years by registration, under the Copyright of Designs Act 6 & 7 Victoria, at a cost of about £10; but if the invention depend upon the combination and working of its parts, you can only protect it by patent, which will cost about £40, the protection continuing for three years; at the end of this time, a payment of £50 will extend the protection to seven years, and then a final payment of £100 will extend it to fourteen years. In any case it is best to employ a patent agent to take the necessary steps.

G. Cort.—As a rule, the saccharo-sulphate of iron may be used with less acetic acid than the plain sulphate; but the best plan in all cases is to use as little acetic acid as you can work with without fog. We forwarded the address by post.

Enquirer.—In our estimation. If the cost be not a great object, procure the card lens of the longest focus he makes; the diameter of the lenses and aperture will be proportioned to the focus of the lens. 2. You had better have the part marked A of glass, as sometimes it will be useful, and when not required, can be covered by means of a blind. 3 We have kept pyroxyline good for years, but it should *not* be kept in a stoppered bottle; but in a jar loosely covered with paper. 4. A lens with an aperture of 2¾ inches, and equivalent focus 6¾ inches should not be slow, rather the contrary. The plan for glass house seems good, and will probably answer well.

W. D. B.—The mottling and irregular marking of the skies in tannin plates has been the cause of much annoyance and vexation to many photographers, and, unfortunately, no certain remedy seems to exist, as the evil appears to arise from various causes. Did the mottling show in the plates before development at all? It does in some cases, and is then most difficult to deal with. Examining the enclosed prints without further information than can be derived from examining them, we should say the markings in No. 1 arise from the film having become loosened and wrinkled during development: No. 2 appears to be mottled from the developing solution having been left at rest instead of being kept moving.

J. Moore.—We have not seen Mr. McLachlan's blinds, and cannot tell how far they answer the purpose. We do not know, either, of any place where they are kept for sale. We cannot very well give you any advice as to getting rid of the sun without knowing something of the construction and aspect of your studio.

Jonathan.—We do not remember to have seen or heard of any style of American portrait known as the "scenotype." Had such a thing existed and possessed any especial excellence, we should certainly have seen it referred to in some of the American journals. The fact is, some of our photographic cousins over the water are like some in this country, very ingenious in getting up sham novelties with high-sounding names, which mean nothing. Possibly your friend is not a judge, or possibly he is hoaxing you. We have a dim recollection of seeing, some years ago, some specimens of an American invention, which consisted of a glass positive, the back of the figure only being backed with glass varnish. The background was nearly transparent, a very dark screen having been used, a coarsely done column, curtain and landscape painted in glaring colours on paper, was then placed behind the picture, and a showy incongruous effect was produced, which pleased persons without taste. This had a name somewhat similar to "scenotype," but we cannot speak certainly of the identity.

Photographs Registered during the Past Week.

Messrs. Helsby, and Co., 34, Church Street, Liverpool,
Three Photographs of Mr. D. James as Ivan in "Mazourka."
Three Photographs of Miss Nellie Nesbitt.
Two Photographs of Thomas Horne as Nicodemus Nobbs in "Turn Him Out."

Messrs. E. and J. Lancaster, Grosvenor Street, Chester,
Photograph of Hugh McNeill.

Ma. John Thomas Case, St. Ann's, Lewes, Sussex,
Photograph of the Battle of Lewes, May 14th, 1264 (from a Drawing by Frederick Colvin).

Mr. W. H. Warner, Ross, Herefordshire,
Three Photographs of Serjeant Dodd, Second Hereford Rifle Volunteers, Winner of "Prince of Wales' Prize," Wimbledon.

Messrs. J. and E. Owen, Bridge Street, Newtown, Wales,
Photograph of J. H. Williams, Esq., Mayor of Welshpool.
Three Photographs of Thomas Savin, Esq., Mayor of Oswestry.
Two Photographs of Major Drew, Milford Hall.

Ma. W. Constable, 58, King's Road, Brighton,
Photograph of Rev. Robert Ainslie.

Mr. J. D. Waymouth, Nailsea, near Bristol,
Photograph of Rev. Richard Wrench.

Mr. James Barritt, Colchester,
Photograph of Rev. Robert Canon Shepherd.

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THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 310.—*August* 12, 1864.

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THE PHOTOGRAPHIC EXHIBITION.

Final Notice.

The tenth exhibition of the Photographic Society is now closed, and, we regret to state, that as regards attendance and pecuniary results, it must be regarded as a failure. Various causes have, doubtless, tended to this end: the smallness of the room, which limited the display to examples of pure photography only, which, as such, we fear, are of very little interest to the general public, whose attendance was especially contemplated in holding a summer exhibition, instead of one in the winter months, as heretofore. On the other hand, photographers who would probably be interested in the exhibition in its purely photographic aspect, are too much engaged in actual duties during the summer to permit them to attend, and as the exhibition was not open in the evening, we fear many of the metropolitan operators have not seen it at all.

But, whatever the special causes of the small attendance and unsatisfactory fiscal results of the present exhibition, the fact forces itself on our attention, which we unwillingly accept, that the time has gone by when an exhibition of photographs, simply as examples of the art for the inspection of the general public, can be regarded as a remunerative undertaking. Photography has now become so widely spread and so familiar, that interest in it as a novel art has ceased. Most persons of taste have at home, in various forms, good specimens of landscape and architectural photography, which have to them, besides such value as they may possess as works of art or photographic specimens, the added interest of being memorials of some tour or visit. The delightful autumn spent in the Scotch Highlands is associated with the charming photographs of Wilson or Annan. Of the honeymoon spent in Switzerland, almost every day has its momento in the shape of a view of the scene by England, Ferrier, Braun, or Bisson Freres. The summer trip to Brighton, Ryde, Margate, &c., are each distinctly memorized by Mr. Blanchard's instantaneous slides. The visits to English churches and castles of the general rambler, and especially of the archæologist, are brought back vividly by some of the grand architectural pictures of Bedford; and so we might pursue the association of photography with the pleasures of memory in the home of most cultivated Englishmen. Then, as for portraits, has not every family its album, or series of albums? Does not her Majesty the Queen, and all the rest of the royal family down to the last baby, grace the portrait galleries of almost every loyal subject, to say nothing of family friends, and of popular painters, poets, politicians, preachers, and prizefighters; stars of the stage, opera, and ballet, and a host of others?

One of the most natural results, then, of this wide-spread distribution of photographs in every family is a decline in the interest in photographic exhibitions. With such a wealth of such pictures at home, each of which, in many cases, is regarded as the best possible specimen of its kind, and having all these charms of association, is it surprising that few of the general public care to visit a collection of photographs having no especial claims upon their attention beyond being good examples of the art? Regarded in this light, the small attendance is no proof of a declining interest in photography, but rather of the fact that the interest is so extended that persons who once gratified that interest only by visiting exhibitions, now make their own collections and examine them at home.

From this it may be argued then, that photographic exhibitions should either cease or assume a new character. The former conclusion we should receive with much regret. Whether they pay or not, photographic exhibitions are at once the incentives to, and the landmarks of progress: they have done good service to the art, and still may continue to do so, and should be upheld, we think, even at some cost. A change in their character might, however, be contemplated without any trepidation. That change might be in one direction or another, or it might combine both. It might be to give the exhibition a still more essentially photographic, and, if necessary, educational character: to offer inducements for the exhibition of all kinds of novelties in process and result, as we indicated in a recent article on medals. To offer inducements for photolithographic processes, carbon processes, iron processes, processes without the salts of silver generally, toning processes without gold, &c; combination printing, and artistic fancy printing generally; macrophotography and microphotography; new applications of photography. At such an exhibition ingenious contrivances and novel apparatus generally might be exhibited; in short, anything of interest to photographers, as such. Such an exhibition should be held at such a time as photographers could conveniently attend, and if short lectures explanatory of processes and apparatus could also be given, alternated with similar lectures on art, as illustrated by the pictures exhibited, we think the exhibitions might assume a character of interest they have never yet possessed. If, on the other hand, or at the same time, the public interest have to be secured, this must be done by the addition of features which will secure their attention, such as coloured work, especially pleasing or popular portraits, and by any other curiosities, novelties, or art features such as good combination pictures, as may be likely to arrest general attention, more than frames of card pictures, or views taken for publications, and such as may be seen in shop windows in any public thoroughfare can be expected to do. We just hastily refer to these questions now, in order to bespeak for them consideration amongst photographers, for it is tolerably clear to us, that without some change in the character and purpose, we have seen the last metropolitan photographic exhibition.

We have but a few words to add on the exhibition which has just closed. The landscapes were numerous and ex-

cellent, but it is not necessary to notice them in detail. The merit of chief excellence has been awarded by the adjudication committee to Major Gresley, but with a protest of two gentlemen out of five. We shall not add any comment on the subject, beyond remarking that some of his contributions were very beautiful, the landscape and figures, "Resting from Play," especially so. We do not know that we break any confidence when we state, that the medal competition really rested between the gentleman who has received it, and Mr. Annan, and that the latter gentleman's chance was chiefly destroyed by a few touches—really unnecessary ones, for we have a perfect copy quite untouched—upon his very charming "Willows by the Watercourses," Mr. Bedford's Warwickshire landscapes, especially one or two of Warwick Castle, were exceedingly perfect. Perhaps no landscapes in the exhibition exceeded in delicacy, and in both photographic and artistic perfection those of Mr. D. H. Macfarlane, taken in India, where hardness and chalkiness have been hitherto regarded as almost inevitable: a "Water-lily Tank at Barrackpore," was an especially soft, delicate, and charming picture. Mr. H. P. Robinson's noble picture of "Stoneleigh Park," which has already taken two medals, we have before noticed; he has besides a wonderfully pleasant bit entitled "A Warwickshire Lane, Spring," with a flock of sheep laying down, and scattered right over the carriage path, just as sheep, with obtuse perversity, generally place themselves in the way of the next vehicle. Mr. Spode's "Fountains Abbey," and some other pictures are very good. The Hon. Warren Vernon's studies of trees are excellent. Mr. Frank Good has some of the very best photographic landscapes in the exhibition. Mr. Gilles' views in the Pyrennees are worthy of much praise, especially for the fine skies and general artistic feeling. Mr. S. Thompson has some good pictures; Capt. Halford has some very fine instantaneous pictures, a feature by the way in which the exhibition is somewhat deficient. There are some other good landscapes, but which, as we have said, do not require detailed notice.

One word in conclusion on the carbon prints. Those exhibited by Mr. Swan were not the best by any means which we have seen of his productions, but they served to show that every gradation possible in the best silver print was here obtained. Some very charming specimens by Mr. Bingham produced by Poitevin's process were also exhibited; these and the very fine carbon prints exhibited during the last few weeks of the exhibition, by Mr. H. Cooper were very similar in result. The only real difference is in the facility of the methods, and we cannot come to any other conclusion than that the difference here is greatly in favour of the English modification.

RETOUCHING NEGATIVES.

The purpose of retouching, whether applied to positives or negatives, should at all times be confined to the removal of defects, without any idea of conferring fresh beauties, for it should be distinctly understood that the best retouched photograph, whether the touching be applied to positive or negative, can never vie in excellence with a perfect photograph which has not been tampered with in any way. It may be that very few photographs are produced which might not be improved by a few touches from the hand of a master; but we have seen a few examples of photographs, pure and simple, which could only have been injured by any touch of the pencil whatever.

There are two kinds of defects, however, which may be remedied by skilful touching on the negative, those of a mechanical character, such as spots and pinholes; and those which will issue in artistic short-comings in the print.

In order to touch the negative with convenience or efficiency, it is desirable to have a small desk, which is contrived for the purpose. This consists of a frame to hold the negative, hinged at one end, and capable of being fixed at any elevation at the other. If raised to about an angle of 45°, and a piece of white paper laid underneath to reflect the light, the character of the negative may be as readily seen as if it were held up to the light. There should also be a sliding bar above the negative, on which the hand may be supported during the operation of touching, so that it need not come into contact with the surface of the negative. As a rule, the negative should be varnished before any touching is attempted, as the varnished surface readily permits the touching to be removed or altered, if necessary.

The simplest and most obviously necessary kind of touching is that for the purpose of stopping out spots or pinholes. This is very easily effected, and only requires a steady hand. A sable pencil of moderate size, with a firm elastic point, free from straggling hairs, or a disposition to part into two or three points, should be selected. Almost any non-actinic, or opaque pigment, may be used, india red or cadmium yellow answer well; we prefer the latter. A little of the colour is rubbed up rather thick on a palette, and applied with a somewhat dry fine point. Great care must be taken to apply just sufficient to cover the hole and no more, as, if the colour be spread, an ugly white spot will be produced in the print, which considerably increases the trouble of subsequent retouching, and the risk of a patchy imperfect effect. Very small spots in dark parts of the picture are best left untouched, as they will, probably, show less in that state than the white spot caused by stopping out, even after it has been retouched in the print. The least possible amount of pigment that will remove the spot should be applied, as, if the colour be impasted on thickly, it will the more readily wear off, and require a repetition of the process.

Touching the negative for the purpose of modifying the quality of the picture is a much more delicate operation, and requires considerable skill and judgment to effect it with any hope of success. Such a plan may, however, be employed for stopping out freckles when strongly marked, for reducing heavy shadows, for putting in or strengthening lights, and occasionally for putting in objects not delineated in the negative.

The last-mentioned purpose, it is very clear, can have but an extremely limited application. It must always be remembered that shadows cannot either be put into a negative or strengthened. Where it is opaque it must remain opaque. Such a thing has been attempted, we know, as to trace black lines in the film with a needle point, but it is impossible to do so without the result being immediately perceptible as a crude hard line, having no harmony with the rest of the picture. All that the most skilful hand can do is to put in or strengthen lights, the darks consisting of the existing transparent parts of the negatives, and it is clear with this limited power that very little can be done in painting objects into the negative. We remember some years ago a statement was put forth to the effect that M. Ferrier was such an exquisite draughtsman that he frequently worked successfully on his negatives, and had on one occasion put in the whole or the greater part of a tree into one of the stereoscopic negatives from which his exquisite glass transparencies were produced. We have always felt certain there must be some mistake in such a story. It is difficult to indicate the simplest object in a negative for a single picture so as not to be detected, in a stereoscopic picture it would be apparent at once. However perfectly drawn, the images would be almost certain not to coalesce in parts, and confusion instead of relief and solidity would be the result. The only objects which can, with any degree of success, we believe, be put into the negative will be the indications of clouds where the sky is not too opaque to print through, and these should consist of the simplest forms, such as low-lying stratus clouds, in which very little drawing is necessary. This should be done at the back of the negative, and any opaque colour may be used: lamp black answers very well. A few streaks of this of a suitable shape, applied at the back of the negative, will give light clouds: the thickness of the glass intervening between them and the sensitive paper has the good effect of preventing sharpness, or defined

edges. Mr. Mudd's plan, which is very effective, consists in stopping out the greater part of the sky at the back, leaving a few transparent places with printed dark stratus clouds. In skilled hands we have seen good effects produced by painting, the forms of clouds on thin transparent paper: this is adjusted so as to cover the sky at the back of the negative, and produce in the print a very good effect.

A process more easy, and very effective when well done, consists in putting in or strengthening lights. Here, of course, a moderate skill in drawing, and an accurate knowledge of the exact photographic value of each touch are necessary to success. A few delicate sharp touches will give sparkling transparency to water which was before a sombre opaque mass: a crisp line added to the angle of a rock brings it out boldly from the rest; a small tower or windmill, almost lost against the distant mountains, obtains due relief and prominence by receiving a delicate touch. We do not derogate from the photographic excellence of Mr. Bedford's pictures, when we state our conviction that many of them derive much artistic beauty from a little skilful touching of the negatives. We might point to the presentation print of the North London Society two or three years ago, a "Study of Rocks at Ilfracombe," if we remember rightly, was an admirable example of this kind of touching. Some fine, large, and wonderfully brilliant Swiss views, by Braun and Co., recently published in this country, are good examples of the same kind of work; they derive much of their sparkling brilliancy from skilfully put in lights in the negative.

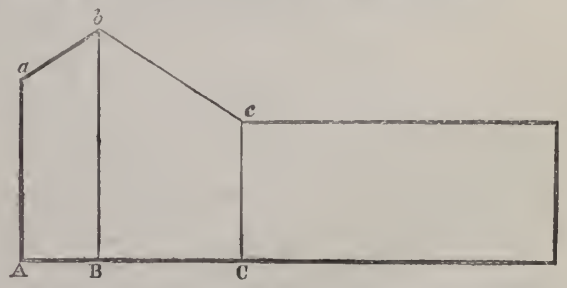
In portraiture, touching the negative has a much more limited scope, and is chiefly confined to removing freckles, decreasing strongly-marked shadows, and very occasionally giving a little force to lights. In large heads, where, despite all precautions to the contrary, the strongly marked freckles of the original are rendered by transparent spots which will print black in the portrait, or where the deep wrinkles of age or of a frown are too severely pronounced, it is possible to touch the negative so as to ameliorate the evil, and it is possible to give a little more drawing to an imperfectly indicated lock of hair.

In order to retouch the negative in these cases most efficiently very great care is necessary. Proceed as follows: Procure a cake of the finest indigo, and a fine sable pencil with a firm delicate point. The indigo may be used alone, and with a very little gum, and if it be found, as it will sometimes, that the varnished surface repel the colour, a trace of prepared oxgall may be used. Now stipple very carefully the freckles, taking care not to let the colour spread over their boundaries, and also to apply the colour in touches of an even thickness. If a large hand lens be employed, it will facilitate delicate manipulation by magnifying the touches. A deep wrinkle or furrow between the eyes, caused by a frown, or deep lines about the corners of the mouth, &c., may also be reduced in the same way. If this be done with care, avoiding heavy patches of colour, the print will not show much trace of the touching, but the freckles and wrinkles will be less pronounced and obtrusive. It is possible, especially in inexperienced hands, that the operation will require performing two or three times, taking a print, examining the effect, and then modifying the touches, before success is attained; and it may happen that a shadow too much effaced will require strengthening slightly in the prints, but still the finished result will be free from some coarseness or harshness which, untouched, it would inevitably have possessed. It will be observed that the colour used in such cases is blue, and is not quite opaque: applied delicately, it softens but does not entirely obliterate the shadows to which it is applied.

Is this kind of touching legitimate? Undoubtedly. Wherever pure photography will achieve perfect results, let us by all means have it. But from some imperfection in the conditions, or where some peculiarity in the original, produce in the photograph a positive defect, it becomes an undoubted duty in the portraitist to have recourse to any expedient which will really improve the result. Modifying an old adage, we would say: "Get good pictures, by legitimate photography if possible; but get good pictures." Let it be distinctly understood, however, that such a resource should not be the substitute for skilful operating. The best touched result will never equal the best result which requires no touching. In connection with the singular discussion to which we have before referred, as to whether the specimens in the exhibition of Mr. T. R. Williams were touched, we recently received a communication form one gentleman, himself a skilful photographer, who suggests that Mr. Williams' negatives are worked on, he says: "I have always admired Mr. Williams' portraits, but I have never felt any doubt as to their being touched in some way. His lenses and collodion can do no more than others, and if a coarse face is to be copied it must look coarse, unless either the negative or print be touched." We mention this here and in this connection, to point our moral, because we are in a position emphatically to state, from personal knowledge, that none of his pictures in the exhibition, that none of his best pictures at all—and in so speaking we refer to the majority of his pictures—are from touched negatives. A lady connected with his printing department does, we believe, very occasionally and very slightly touch negatives, but only where it is desirable to ameliorate physical peculiarities, and the pictures are always regarded as slightly inferior, in consequence of having required it. We emphasise this simply to enforce the idea, that touching may modify defects, but can rarely confer beauties, and to dissipate any idea, that great excellence is the result of any kind of dodging, rather than the skilful and legitimate practice of photography.

A CHEAP GLASS ROOM.

We recently visited and examined a new glass room, which Mr. Noel E. Fitch, whose name many of our readers know as a very skilful amateur, has had erected in the garden connected with his residence at Brixton. This studio struck us, as combining neatness, convenience, efficiency, and cheapness, in a greater degree than any we have hitherto met with. The principle upon which it is built is that which under various modifications has been frequently adopted of late, but of which the first general design was published some years ago by Mr. Sutton. The following is a sectional view of M. Fitch's modification of this glass house.



The total length is 28 feet; of this 4 feet of each side and at the top at the back-ground end is opaque, 10 feet glass, and the remaining 14 feet wood. The height of the studio portion is 11 feet at *b*, and 7 feet at *c*, and 10 feet wide. The portion for the camera, in which there is no light, is a little more than 7 feet high at the side, and 8 feet wide. The side lights on each side have glass to the extent of 10 feet by 7 feet high. The roof from *b* to *c* is glass. The opaque parts of the roof are of zinc. The remainder is well and firmly built of glass and wood, each of good quality, well and neatly put together and painted. There is a door at each side at C, each of which being opposite the other admits of ready ventilation. A small but conveniently arranged dark room is erected in the unilluminated portion. A platform of about three inches high forms the floor of the studio portion,

whilst the camera portion is paved with square red tiles, which have the great advantage of causing no dust, being easily cleaned, and forming a solid non-elastic foundation for the camera stand. The whole building rests on a foundation of wood, being built on a stout plank. Stone or brick would have been better, but their employment would have brought the erection within the scope of some obnoxious clauses in the Building Act. As we have said, every part seems strong, and efficient, and well and neatly finished. The total cost we understand for construction and material (the tiles in the floor excepted, which Mr. Fitch had in his possession), was £20 5s. 0d., a price which strikes us as exceeding low for a studio in all respects so satisfactory.

The aspect of the studio is such that the sitter faces north-east, the studio having on the north and east an uninterrupted light, whilst the south and west light are considerably excluded. Mr. Fitch finds, by very simple and easy arrangement of the complete set of blinds he has put up, that the lighting of his picture in the room is in all respects satisfactory.

PHOTO CHEMISTRY.

BY DR. VOGEL.

It has been established by numerous experiments, that a plate of copper exposed to the rays of the sun, and afterwards applied in the dark to photographic paper, produces an impression, although it then emits no light; the invisible radiations having previously produced an effect upon impressionable substances, it was to be presumed that their phosphorescent lights would be produced also, and in a more intense degree. This subject I have undertaken to study; and to this end I have procured a photographic paper, the sensibility of which is such that, exposed four seconds to the ordinary light of day, it undergoes a very evident change.

My first researches bear upon the light emitted by phosphorus itself.

In placing the paper in a receiver, in proximity with phosphorus, no result was obtained. Besides, we cannot think of placing the paper and phosphorus in contact, because the experiments of M. Niepce de Saint Victor (1861) prove that the vapour of phosphorus acts energetically upon photographic substances, through a thick layer of filtering paper, while the interposition of a sheet of glass interrupts all action under similar circumstances. To arrive at unquestionable results, I put into a U tube of thin glass, a solution of phosphorus in sulphide of carbon, and left it to evaporate, so as to cover the interior of the tube with a thin and uniform coating of phosphorus. In afterwards making a current of air pass through the tube, the light disengaged was strong enough to permit the reading of printed text easily.

This tube was then enveloped in photographic paper, covered in part with bands of black paper, and itself enveloped in black cloth. The whole was placed in a metallic vessel, and a current of air established. This was produced by an aspirator placed outside the camera, and communicating with the tube by a hole cut in the door. The sensitized paper was thus wholly protected against the emanations of phosphorus.

The experiment was continued for twelve hours, during which I assured myself from time to time, that the phosphorus had not ceased shining strongly, and only after this time was the paper unrolled and washed. Upon examining it by daylight, I saw that the parts in contact with the tube had been impressed in an undoubted manner. Nevertheless, the action was remarkably weak, considering the duration of the experiment, and the intensity of the light. It would doubtless have been much more energetic if the glass tube could have been suppressed, as it intercepted a great portion of the photo-chemic radiation. We know, in fact, that a candle burning freely, acts more rapidly upon photographic paper, than a lamp with a glass shade, the photo-metric intensity being four times greater: this was proved by a special experiment.

In another experiment iodized collodion was impressed by the light of the phosphorus; but the experiment lasted three hours, and the same result would have been obtained in six seconds by diffused daylight.

In putting into immediate contact with the photographic paper various phosphorescent substances, such as sugar and fluor spar, the results obtained were still less marked. Coarsely powdered spar, strongly heated in a platinum capsule, and cooled in the sun's rays, at length produced perceptible traces upon the paper, which were much less apparent when employing spar cooled in the dark; sugar exposed to the sun gave no result.

The author states, as a remarkable circumstance, the loss of weight the photographic paper undergoes under the action of the sun. A paper completely dried in the dark, then exposed to the sunshine and dried again lost 15 milligrammes in 11·20.—*Report of the Munich Academy of Sciences.*

FOGGING.

BY M. MC A. GAUDIN.

Nothing can be more vexatious and annoying to a photographer than seeing his negatives invaded by fog at a moment when least expected, while developing with protosulphate of iron, so much in vogue at the present day. There is scarcely an operator who has not had to submit, grumbling, to this annoyance; I have known some who, in despair, have sent away their sitters, and appointed another day upon which they hope things will have remedied themselves, so little did they feel that it was in their power to discover the cause of the *accidental* fogging. I say accidental fog, to distinguish it from that which necessarily results from elements which are too active, either from excess of neutrality in the collodion, sensitizing bath, or developing solution. The fogging of which I now speak is that produced unexpectedly when operating with materials that had previously given unexceptionable results.

Let me first remark that this fogging makes its appearance principally during hot weather, and so suddenly that we might be tempted to attribute it to atmospheric electricity, which, undoubtedly, plays the principal part in it; it is for this reason I think that during the prevailing heat, it will be advisable to remove as much as possible all causes of disturbance.

The several ingredients employed at the present day to obtain a negative picture are all of a very complex nature, and under the permanent influence of a high temperature, they are necessarily modified differently than during winter. It is well known that a fresh preparation requires time to fit it for use. From the mixture of salts with collodion, ether, and alcohol, there results indefinite ethereal compounds, which reveal themselves by a pleasant odour: in all probability, there is a formation of aldehyde which produces sensibility when it exists in moderate quantity, but which becomes injurious when it is in excess.

I am therefore led to believe that the cause of accidental fogging in warm weather results from a sort of ethereal fermentation produced under the influence of heat, aided by a body in a state of fine division like collodion, which, in this case, plays the ordinary part of porous bodies, so powerful in facilitating combinations; in that case the best remedy will be to isolate the sensitized collodion from its silver bath.

This compels me to repeat that the sensibility of a plate is entirely *independent* of the presence on it of the silver bath which has served to sensitize it; that we can thoroughly wash this plate without in any way diminishing its sensibility, provided that, before developing the picture we return the plate to the sensitizing bath, so as to impregnate it with as much nitrate of silver as it had before being washed; in a word, it is for developing, and not for exposure that the presence of the silver bath is necessary.

During warm weather, the silver bath adhering to the plate undergoes in the twinkling of an eye, all kinds of metamorphoses; the solution concentrating on certain places is sure to corrode the iodide of silver, causing inequalities, and if the slightest reaction is established under their influence, the silver bath is immediately disturbed, and perhaps decomposed, by light alone, without the aid of iodide of silver impressed by light; without reckoning that the plates moistened all over with nitrate of silver, cause a wastefnl loss of the sensitizing bath, which stains the frames, and serves only to produce those long black streaks which often spoil the finest negatives.

I repeat then, that during the warm season, instead of conveying the plate directly from the sensitizing bath to the frame of the camera, it will be advisable, in order to avoid fog and stains, to dip the sensitized plate into a bath of distilled water, which, sufficiently capacious, will require to be renewed only when it becomes of the strength of 5 per 100. Only, it will be necessary, when the distilled water has been quite recently renewed, to pass the plate into the sensitizing bath again before developing, but from the time the silver in the distilled water bath amounts to 1 or 2 per 100, this precaution will be unnecessary. Still more so, as the accidental fogging is also, in all probability, caused by the *extreme* concentration of the silver bath; for if the developing solution is made for a bath of 8 per 100, it must cause great disorder when mixed with a bath which attains 15·20 and 25 per 100 in certain parts; and from this fact, it is only necessary to produce a precipitation first with strong silver, for the fog to spread gradually over the entire picture.

By proceeding in this way we shall be freer from anxiety when the exposure of the proof is delayed by some unforeseen circumstance. With a silver bath reduced to 2 per 100. nothing need be feared; and I can understand that this method will be universally adopted as soon as it is proved that the strength of the silver bath has no influence upon the sensibility, and that the strength of the bath present during exposure is a constaut source of inequality, stains, and accidental fogging.—*La Lumière.*

PHOTOGRAPHIC TOUR IN EGYPT.

BY M. LE VICOMTE E. DE ROUGE.

Report Presented to the Minister of Public Instruction.

Monsieur le Ministre,—Your Excellency will, perhaps, excuse me, if I limit myself to giving a summary account of the mission I have undertaken in Egypt, during the past six months. The excessive fatigue that has followed this period of laborious activity, will not permit me to give a detailed account of the important additions to knowledge which the immense mass of material we have collected affords. Six volumes of unpublished inscriptions, copied by hand; two hundred and twenty photographic plates, representing the historic walls of the temples, the larger inscriptions, and the finest monuments of Egyptian art: such, briefly, is the list of the spoils we have collected in ancient Egypt.

Organized by the ministers of state and of public iustruction, under the direction of his Majesty, our mission included all the elements of a profitable task. A learned epigraphist, M. Wechser, accompanied me to exauine the Greek inscriptions. My son prepared himself, by three years' special study, to aid me in the difficult task of copying the hieroglyphic inscriptions. M. de Bauville gave me the aid, now so indispensable to archæology, of his proved skill in photography. Lastly, by permission of his Highness, the Viceroy, M. Mariette joined the mission, and constantly enlightened us by his profound knowledge of antiquities, and communicated to us the discoveries made in the ruins he excavated.

His Highness Ismael Pacha, anxious to contribute to the success of our mission, placed an excellent steamboat at our service, by which we experienced the twofold advantage of avoiding loss of time in traversing long distances, and of having the resource of a healthy and commodious establishment, so valuable for study. Thus we have been able to work with uninterrupted assiduity, feeling no fatigue until the task imposed upon us was finished.

A mere list of the new documents we have brought back with us, would swell this first report immeasurably; I limit myself at present, to naming to you the principal objects of the studies around which these documents group themselves; neglecting the course of our journey, but rather confirming to the historic order, our aim and the hopes of our progress will thus be more easily understood.

The most ancient epoch that we have studied in Egypt, by contemporary monuments, belongs to the fourth dynasty; that is, to an epoch which certainly precedes our era by more than twenty-five centuries. It is recognized that chronological calculations cannot, with certainty, be extended beyond that limit; this is proved by the variety of systems of chronology; but we are none the less provided with a real history, certified by monuments, still existing in immense works, and of which a host of details and new personages, revealed iu excavations made by the Egyptian government, now enrich and fructify our knowledge.

The anterior dynasties were hitherto known only by the royal lists, the one transcribed in some extracts from Manethon, the others preserved on monuments. The new list found by M. Mariette in the tomb of Sakkarah, is certainly the most interesting of these documents. It gives us the names of many kings of the second and third dynasty, under their Egyptian form. The tablet of Memphis, (such is the name given to it by our learned associate), has been photographed and copied, with all the elements necessary to the complete discussion of a text more precious even than the celebrated tablet of Abydos.

The tombs of Gizeh and Sakkarah discovered of late years, have been minutely studied: they have revealed to us the names of a host of personages belonging to the first monumental epoch: there are the queens, princes, and high functionaries, who lived under the reigns of Choufou, Schaphra, Menkeres, and their successors. The most aucient king of whom we have a contemporary monument, is named Senophra, his place in history was previously disputed. The tomb of a princess who occupied an eminent position under the successive reigns of Senophra, Choufou, and Schaphra, induced me finally to recognize in Senophra, the king who, in the Manethon list, is named Soris, and standing before Souphis (Choufou), at the head of the fourth dynasty. The succession is continued by a considerable quantity of tombs, the study of which will permit of the arrangement of a very extensive table of Egyptian civilization, under the fourth and fifth dynasties.

The history of art, at this remote epoch, impresses the mind as one of the most curious problems given to us to meditate upon. Hitherto we have known the art of the fourth dynasty by the imposing masses of the pyramids, which from early times, struck the most skilful architects by the grandeur of their appearance, the perfection and pose of the blocks, and the astonishing accuracy of their orientation. The temple of the sphinx, discovered by M. Mariette, also attests the harmonious employment of the richest materials and the adoption of the finest proportions.

But, let us ask if the people who so early worked granite and alabaster with so much taste and facility, were skilful only in architecture? The ruins which have enriched the museum of Cairo, with so many statues of this early epoch, answer this question. Photography, an incorruptible witness, here lends us the aid of the most skilful pencil, whose authority is unrivalled. The portraits of these antique statues, of which we have brought excellent specimens, show to the most inexperienced eyes, that the principles of the earliest Egyptian art, was Nature faithfully observed and skilfully copied.

Exact proportions, the principal muscles carefully studied, and the individuality of the portait often happily caught—such are the praises that we can at the present day award to the artists of primitive history, whether they limit them-

selves to carving the calcareous lime-stone, or to employing the wood of trees growing in the valley of the Nile, or whether they attacked the hardest rocks, as in the statues of King Schaphra, and rendered themselves masters of the most obstinate granite with a power and suppleness of chisel that we cannot too much admire.

This new-visaged people, brought from the ruins of Sakkarah, is quite a revelation, for the sculpture of the age of the pyramids was not previously known, except by rare and ill-cared-for specimens.

The *souvenirs* of the fourth and fifth dynasties are grouped, and, so to speak, concentrated around the ancient site of Memphis. Those of the sixth century are somewhat scattered, and we have had to glean some inscriptions of King Papimerira all over Egypt, from San to Abydos, and the rocks of Assouan. They may, perhaps, throw some light on the difficult question of succession; for, in fact, we know of no monuments that can be classed with certainty, between the sixth and eleventh dynasties, but are led to conjecture that the royal families to which the lists of Manethon have given this place, represent only the partial and contemporary *souvenirs* of other Pharaohs. However that may be, the ruins of Thebes have added much to our knowledge of the first Theban Kings, those of the eleventh dynasty. Their sepulture has been discovered; many of their sarcophagi have even arrived at our museums. In the funereal field of this dynasty we have been able to study a new obelisk, and to see also a stele in its place before the ruined pyramid which served as the tomb of King Anetph. This ruler, apparently a great hunter, is represented surrounded by his favourite dogs, whose very names and qualities he has sought to convey to remote posterity.

The family of Anteph probably governed the Thebaid only; but with the twelfth dynasty we enter a monumental era, the grandeur and fertility of which have for a long time been known to us. The new excavations are very rich in monuments of this beautiful epoch.

The first important structures we encountered at Tanis or Avaris (for we believe that these two names designate the same city), are the work of Ouserbasen I., and all his successors have continued his work, as is proved by our series of inscriptions. We have carefully copied the legends which accompany the beautiful statues of this dynasty, while photography has depicted them.

We may specially point out for delicacy of features, and the arrangement of the hair, two statues in diorite representing Queen Nophra.

As for the colossus of King Ouserbasen I., it is one of the *chef d'œuvre* of our museums, which, too neglectful of their interests for a long time, now envy the museum of Cairo. A very celebrated fragment of the colossus which served as a pendant to Tanis, and which is now in the Berlin Museum, will give archæologists a very correct idea of the value of this *morceau*.

We have also examined and photographed another colossus of the same king, at Abydos, where the twelfth dynasty has left numerous *souvenirs*. This locality has supplied the museum at Cairo with a rich series of inscriptions of the same period, all of which we have copied or photographed.

It was to the north of the plain of Abydos that M. Mariette found, under a triple layer of ruins, the remains of the wall of the most ancient temple of Osiris. Against this wall, now so deeply buried, a series of officiale steles attest the successive visits of sovereigns, anxious to render homage to the old sanctuary. But most of these texts crumbled to dust upon exposure to the air.

We have disputed with the hand of time for everything that could possibly be snatched from it, and we have copied whatever an attentive and repeated study permitted us to appropriate, in spite of the lacunæ which, at every moment, interrupt the story.

The twelfth dynasty has left everywhere traces of its power; from Lower Egypt to the extremity of Ethiopia, from Tayoun to the Peninsula of Sinai. We know by the study of some debris, that Yusertasen I. had constructed a sanctuary at Thebes, which was destroyed at an unknown period. An inscription recently found at Karnak, has shown me that this sanctuary was not overthrown at the time of the pastoral kings.

An object of respectful solicitude on the part of the Pharaohs, it had been carefully repaired, under the twentieth dynasty by the high priest Amen Hotep, which proves to us that it was taken into consideration in the general plan of the great works executed subsequently at Karnak, by the Thotmes and the Amenophes.

The smallest historic documents belonging to the following dynasties particularly deserve our attention. According to a system maintained by various *savants*, and which rests upon the authority of the name of Lepsius, the invasion of the pastors came to interrupt the departure of the national Pharaohs immediately after the twelfth dynasty. We have collected Abydos, and from the rocks of the isles near the first cataract numerous *souvenirs* of the family of Sevek Jotep, which belong to the thirteenth. But these data, very useful from any other point of view, decide nothing as to the question I entertain; for the occupation of Lower Egypt by the pastors, and their incursions, however disastrous we may suppose them to have been, would not have absolutely interrupted the monumental series in Upper Egypt. But at Tanis it is quite different; in this city, the actual boulevard of the frontier of the coast of Palestine, and where we continually go to seek the very seat of the power of the pastoral kings. Senek-Hotep III., the fourth king of the thirteenth dynasty, reared up granite colossi; we also remark the beautiful colossal figure of a Pharaoh named Mour-Maschau, the inscriptions of which are in the celebrated royal list in the Papyrus at Turin, among the sovereigns of the same family. Certainly the pastors had not passed the frontier at the time when the images of these Pharaohs were peaceably erected at Tanis to testify their dominiou.

(To be continued.)

REDUCING OVER PRINTED PROOFS.

In a recent communication to the French Photographic Society, M. Faure says:—

"Yesterday, when proceeding to tone the prints produced during the day, I was not a little disappointed in finding an entire series of proofs from the same negative, and which ought to be delivered to-day, so metallized that I thought it would be impossible to bring them to a proper tone. In fact, notwithstanding the care I took during the toning, they remained in such a state that it was impossible to deliver them.

"I was about throwing them among the waste, when it occurred to me to try the effects of a weak solution of cyanide of potassium. After toning, fixing, and washing for half an hour, I immersed one of the proofs in a dish containing—

Water	7 ounces
Cyanide of potassium	5 grains.

But this proof, which, although much too dark, was rich in tone, became of a blackish grey, dull, and disagreeable; the whites were not pure, they appeared fogged.

"To remove this inconvenience, I added to the bath of weak cyanide two fluid ounces of a solution of gold, of the strength of 1 per 1,000, and recommenced the experiment upon a second proof, which succeeded very well. The metallized parts disappeared to give place to delicate details, and the whites became pure, while the half-tones were well preserved. Delighted with the result, I repeated the experiment upon fifteen proofs, all of which can be delivered this morning, with the exception of the one I send you as a specimen.

"This kind of toning, for it really is one, is good for red

proofs, the colour of which arises from want of toning; by its employment we can obtain a violet black, or ink black, or pure black hue, according to the time of immersion, and this, too, without impairing the purity of the whites.

"Doubtless this method is known, but having never seen it described, and not knowing whether it can be employed without injury to the proof, I have thought that in the interests of photography I ought to bring the question before you.

"The picture, which, after toning, fixing, and washing, is submitted to a bath composed of cyanide of potassium and gold, is it more or less permanent than before the operation usually followed with extensive washing?"

M. Girard observed that, as M. Faure supposed, the employment of cyanide of potassium for weakening pictures is known. It originated with M. Humbert de Molard, who communicated it to the society in 1855; he also added, that the employment of this substance is unattended with danger to the durability of the proofs, but that it requires very careful manipulation. M. Humbert de Molard said that the employment of cyanide and of iodous cyanide must be made with precaution, but that it possesses great advantages for reducing metallized proofs. He also considered that proofs treated in this manner are more permanent than any others, after withdrawing the printed proof from the pressure frame; he exposed it for five minutes in the sunshine, until the whole surface became solarized, and then easily made the picture reappear by the moderate use of cyanide of potassium, in the same state as it presented upon removal from the pressure frame.

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

(Continued from p. 377.)

A refutation of these views is no longer necessary, as Davanne has recently admitted that he was in error. The whole phenomena is due to the circumstance that the film of albumen retains a certain quantity of silver (perhaps in the state of albuminate), and that this, by exposure, acquires the property of producing a picture with the developing fluid—a property which is destroyed or weakened by nitric acid (*Photogr. Archiv*, 1863, p. 73). On the other hand, Schnauss, Hardwich, Monckhoven, and others regard the change of iodide of silver as a purely physical one.

It is remarkable that in the collodion process the sensitive substance employed is not a film of chloride of silver, which undergoes the strongest *visible* and chemical changes by exposure to light, but a film of iodide of silver, which, as already indicated, experiences the least alteration of colour and no chemical change, or a mixture of iodide and bromide of silver. Why do not photographers employ pure bromide and chloride of silver, but only iodide of silver, as the sensitive film? For the solution of this question, it is necessary, in the first place, to test the photographic behaviour of each of the haloid salts of silver by itself. Before describing my own experiments, I will cite the most important statements of former investigators.

Soon after the publication of Daguerre's process for producing a picture on iodized silver plates, after exposure, by means of vapour of mercury, Claudet,† Gaudin,‡ and Moser§ found that a silver plate which had been treated with chloride and bromide of iodine was considerably more sensitive to light than a merely iodized silver plate, that is to say, it developed a picture in the developer after a much shorter exposure to light.

Schnauss says (*Dingler's Journal*, p. 146) that iodides retain the impression of the light very tenaciously, and become much blackened in the developer; bromides, on the contrary, are but weak. Others thought that bromide of silver was particularly sensitive to *green* rays (Hardwich, *Manual*, p. 87: Barreswille and Davanne, *Chimie Photographique*, p. 413). Schrank found by experiment (*Photograph. Archiv*, 1851, p. 61), using a green model, that a collodion film with bromide of silver is much less sensitive than one with iodide of silver, and that even the mixture of iodide and bromide of silver shows less sensitivity than iodide of silver alone.

With regard to the mixture of bromide and iodide of silver, Hardwich asserts that under certain circumstances the addition of bromide to iodide of silver may diminish its sensitivity, namely, when a weak silver bath is used, with pyrogallic acid as a developer, but that it has no diminishing action with a strong silver bath and a solution of iron as a developer. Moreover, the pictures are said to be clearer and free from spots (Hardwich, *Manual*, p. 148).

Sutton says that bromides increase the sensitivity when no organic salts are present in the developer, but otherwise they diminish it (*Photogr. Archiv*, 1861, p. 32). Liesegang also states (*Photogr. Archiv*, 1861, p. 161) that the different results which have been furnished by iodide of silver in conjunction with bromide are due to differences in the nature of the developer.

When developed with sulphate of iron, bromo-iodide of silver proves to be decidedly more sensitive, but not with pyrogallic acid; and with preparations not perfectly pure bromo-iodide of silver gives pictures much freer from faults, reproduces the half-tints more distinctly, and prevents the so-called solarization.

From these historical notes it appears that but few experiments have been made with pure haloid salts of silver, and especially with the bromide and chloride.

I undertook a number of experiments to determine the behaviour of pure haloid salts of silver, after insolation, towards developing agents. For this purpose I prepared a quantity of sheets of paper soaked with the above-mentioned substances, by floating clean photographic paper for two minutes upon solutions of 10 parts of iodide and bromide of potassium and 5 parts of chloride of sodium in 100 parts of water, and then hanging it up to drip and dry. (The above proportions of K I, K Br, and Na Cl nearly correspond with their equivalents.) The papers thus prepared were then floated by the light of a dull gas lamp for two minutes upon a solution of eight parts of nitrate of silver in 100 parts of water, hung up to drip, and finally thrown into a large dish with water. From the first dish they passed into a second, then into a third, and so on until the washing water no longer gave a reaction of free silver. The papers were then again hung up to drip, and, lastly, dried by means of heat and bibulous paper.

In order to investigate the change which might possibly be undergone by the paper in the silver solution, a piece of clean paper was submitted to the same treatment in the silver solution as the above-mentioned prepared papers.

The paper with chloride of silver appeared pure white, that with bromide pale yellow, that with iodine dark yellow, and the clean paper white. They were all preserved in the dark room in closed paste-board boxes, which were themselves placed in wooden boxes. They kept well for three or four weeks, but afterwards showed by a slight colouration that, notwithstanding all the precautions taken, a trace of light had penetrated to them, and produced in the course of weeks the same change as strong light in a few seconds.

Small strips were then cut from the papers and stuck, for the purpose of testing their behaviour towards light, into a book: they were then exposed to the light, and drawn out at intervals of one or more minutes or seconds. After the termination of the exposure, they were carried back into the dark room, moistened with water, and treated with the developer.

The developer consisted of a solution of 1 grain of pyro-

* From *Poggendorff's Annalen*.
† *Journal of the Photographic Society*, May, 1861.
‡ *Comptes Rendus*, October 18, 1841.
§ *Poggendorff's Annalen*, xlvi. p. 200. Moser says, ten times as sensitive.

gallic acid and 1 grain of citric acid in 250 parts of water. To 5 cubic centimetres of this 4 drops of a solution containing 5 per cent. of nitrate of silver were added, and this mixture was poured over the papers. (Sulphate of iron is not applicable as a developer to paper.) The only object of the addition of citric acid is to retard the reduction of the silver salt by the pyrogallic acid.

If pure pyrogallic acid be mixed with a solution of silver, a precipitate of granularly pulverulent silver is almost immediately produced, mixed with a black substance, which may be extracted by ammonia. A precipitate produced thus instantaneously, however, is deposited not only on the spots which have been acted upon by light, but also on those which have not been affected. It is otherwise when an acid is added; the precipitate is then lighter, that is to say, purer; it makes its appearance more slowly, and deposits itself first upon the spots acted upon by light; and it is only afterwards, when the decomposition is approaching its termination, that parts not acted upon are slightly coloured. It is, however, easy to remove the developer before this point is reached, and thus to obtain the proper result.

After development, I allowed a stream of water to flow over the papers, washed them out, compared their colouration by lamplight, and fixed them with hyposulphite of soda when it seemed to be necessary.

First experiment.—Strips of each of the papers, including that immersed only in the nitrate of silver, all half covered, were exposed for one minute in diffused daylight. The iodide paper became slightly grey, the bromide paper pale greyish violet, and the chloride paper pale violet. All the papers were then treated with the developer. The exposed parts immediately become darker—most rapidly in the case of the iodide, later with the bromide and chloride. The colouration gradually increased, producing with the iodide a deep blackish grey, with the bromide a slighter brownish grey, and with the chloride a pale yellowish brown tint. The plain paper was perceptibly coloured, although very slightly, on the exposed part. If the plain paper be exposed to the light for *several minutes*, it becomes brownish, a proof that, notwithstanding the washing, it has retained a trace of silver.

Second experiment.—The same experiment was repeated, but pyrogallic acid without silver solution was poured upon the papers; by this means they acquired no colour, even when the action was continued for some minutes.

From these two experiments it follows:

1. That pyrogallic acid alone does not alter insulated paper with iodide, bromide, and chloride of silver.

2. That those haloid salts acquire, by exposure to the light, the property of attracting and retaining nascent granularly pulverulent silver.

3. And that paper which has been immersed in solution of silver retains a trace of silver even after long washing, acquires a brown colour by exposure, and behaves with the developer in the same way as exposed chloride, bromide, and iodide of silver.

I now endeavoured to compare more accurately the intensity of colouration acquired by the above-mentioned papers in the developer after equal insolation, but found, from repeated experiments, that the results were not always exactly alike. I soon noticed that a want of uniformity in the preparation was the cause of this. About this time appeared the work of Bunsen and Roscoe (*Photochemische Untersuchungen, Pogg. Ann.* cxvii. p. 529), in which Bunsen states that, in order to prepare a uniformly sensitive chloride paper the paper must be completely immersed in the solution of the metallic chloride. In accordance with this, I prepared a new series of papers, immersing them completely in the solution of chloride of sodium and iodide and bromide of potassium, and also afterwards in the silver solution, but treating them in other respects exactly as above described. The papers thus obtained gave concordant results.

Three such papers were stuck into a book, with their ends projecting; the book was then put into a pasteboard box, and carried into diffused light. The box was then opened, and the papers drawn out at intervals of half a minute: the exposure was continued thus for two minutes, and then the whole was carried back into the dark room. The iodide of silver was pale grey, the bromide pale greyish violet, and the chloride pale violet. With the chloride and bromide the colouration was deeper in proportion to the duration of the exposure. With iodide of silver, the portions exposed for more than one minute did not appear more deeply coloured than those exposed only for one minute; but the latter were somewhat darker than those exposed for half a minute. When treated with the developer, the iodide was coloured most rapidly; next the bromide, and later still the chloride.

At first, differences appeared in the colouration of the individual portions which were exposed for different periods to the light; but these very soon disappeared with the bromide and iodide; they then acquired a pretty uniform colouration on the portions exposed for more than one minute; but a somewhat weaker one on those exposed only half a minute. The iodide became blackish grey, the bromide light brownish grey. The chloride paper only acquired a slight yellowish brown colour, which became more and more intense the longer the time of exposure.

It is to be observed that the chloride and iodide acquired some colour even on the unexposed portions, the former becoming slightly yellowish, and the latter slightly grey; the bromide, on the contrary, remained uncoloured on the unexposed portions.

From these experiments, which were repeated five times with the same results, it follows that:—

Of the three silver salts after exposure to the light under precisely the same conditions, the iodide becomes most intensely and the chloride most faintly coloured in the developer.

This result is certainly remarkable. It is exactly that silver salt which, *when alone*, undergoes the most intense alteration of colour and chemical change by exposure to light, namely, the chloride, that acquires the weakest colouration with the developer; whilst the iodide, which undergoes the least visible change, and no perceptible chemical alteration, when exposed by itself to the light, acquires the most intense colour with the developer. From this it follows, as will be confirmed by the following investigations, that the changes effected by light, which render these bodies capable of attracting particles of silver, are not parallel to the chemical changes, and are, therefore, something different from them.

I must therefore assume that there is another action of the sunlight besides the chemical one. To this action of light, which makes iodide of silver and other bodies attract and retain granularly pulverulent silver, I give the name of *graphic action*. I give the name of *photographic sensitivity* to the faculty possessed by certain bodies, after insulation, of attracting granularly pulverulent silver and also other bodies, for example, particles of mercury, in the daguerreotype process; and that of *photographic colouration* to the dark colour which they acquire in the developer.

In opposition to these I place the *chemical action* of light, that is, the tendency to chemical decomposition or combination produced by light.

The *photochemical sensitivity* is the faculty possessed by certain compounds of being chemically decomposed in the light of the sun.

The *photochemical colouration* is the change of colour which they at the same time undergo.

I may, consequently, put the above statement thus:—*Iodide of silver is photographically most sensitive, chloride of silver least sensitive, and the bromide occupies the middle place.*

(To be continued.)

Artificial Ivory.—A firm in New York offers a reward of 10,000 dollars, equivalent to £2,000, for the invention of a substance which shall possess all the properties of ivory for the manufacture of billiard balls.

Proceedings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting was held July 21st, at 12, York Place, Portman Square, Lieut. Col. the Hon. D. F. de Ros in the chair. The minutes of the last meeting having been read and confirmed, the following members and subscribers were elected:—F. Newton, Esq.; T. R. Lane, Esq.; Mrs. George Booth; Miss A. Ripley; R. Milligan, Esq.; Captain Bryon; E. S. Bowlby, Esq.; Dorabgee Punduugee; W. D. Howard, Esq.; Rev. W. A. Bathurst; H. T. Freshwater, Esq.; E. C. Hollist, Esq. R.A.; R. Brown, Esq.; J. J. Benyon, Esq.; J. Wales, Esq.

The following members of council were then proposed and elected:—The Earl of Rosse; Arthur Farre, Esq., M.D.; Major Durnford; the Hon. L. Wingfield; Walter Prideaux, Esq.; Major Russell.

The examination of the photographs which had been contributed by the members during the year, was then proceeded with, but owing to their high average, and the large number of meritorious pictures in every class requiring most careful consideration, it was found to be impossible at once to make the award. The further examination and classification of the pictures, were then referred to the referees, who promised to report on them as soon as they could arrange them satisfactorily with the view of assisting the council in their difficult task. The proceedings then terminated. A. MELHUISH, Hon. Sec.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, August 11th, 1864.

THE Photographic Society of Marseilles resumed its meetings on the 2nd ult., after a rather long suspension, which has been a source of general regret. It is hoped, however, that the society will renew its functions with unimpaired vigour, for we cannot forget how much we were indebted to it on many past occasions.

In a discussion which took place, it was generally admitted that with dry collodion results could not be obtained so good as those with wet, and the cause of the difference was canvassed. M. Teisseire, in supporting the hypothesis, generally admitted—that light acts by penetrating a substance which possesses the property of absorbing it—attributes to the dry collodion film a less absorbing quality than that possessed by wet film; hence a less profound impression upon the dry collodion, a slower development, and consequently more harshness in the portions of the negative corresponding to the dark or black parts of the subject copied.

MM. Teisseire and Jaquemet have occupied themselves chiefly with copying engravings, and, although it would be a great advantage to them to be able to operate with dry collodion, they are satisfied that they cannot obtain results with it so good as with wax. They note, however, a difficulty attendant upon copying engraving which is not inherent to the process, which consists in obtaining in those delicate lines which melt into the lights, aureola of vague points which forms around these lines, less defined than the stronger lines, although the whole is in true focus. It was thought that this imperfection is due to a radiation or reflection of diffused light. This is one of the difficulties attendant upon copying engravings which renders what may appear so easy to the beginner really one of the most difficult operations to perform successfully.

On the subject of enlarged positives M. Vidal remarked that it was to be feared that the diffusion of the luminous rays, which increases in proportion as the primary negative is enlarged, will prove an invincible obstacle to the perfection of enlarged pictures. We may certainly obtain effective proofs, but we shall vainly seek in them the delicacy and precision of direct positives.

Without dwelling upon the imperfection due to the magnifying of the texture of the collodion and impurities it may contain, it is as well to recognize that the mechanical fact of diffusion cannot be corrected: a series of points placed in a straight line in an infinitely small space may in appearance be so blended together as to appear a continuous line; but it will not be so if this line is magnified, it will then appear as a series of points perfectly distinct and separate from each other. The diffusion of rays may be compared to the effect thus obtained, and it does not appear that any means exist of obviating this inconvenience.

With the means at our disposal, the greatest possible improvement in enlarging consists in avoiding, on the one hand, all the imperfections inherent to the original negative, and, on the other, all causes of aberration arising from the apparatus employed.

M. Vidal's experiments induce him to believe that the illuminating lens must be achromatic, especially in those cases where we seek to obtain direct proofs upon chloride of silver paper. He referred to Dr. Van Monckhoven's remarks on this subject, believing that the coloured rays cease to be an inconvenience only when it is possible to interpose a ground glass between the illuminating lens and the negative; in which case all aberrations caused by the illuminating lens is corrected. He is, however, of the opinion of those who prefer to obtain a negative of the required dimensions, as much loss of time is thus avoided. But what is even preferable is, that we can interpose a ground glass between the negative and the illuminating lens, which allows of a diffusion of the rays on leaving the lens, the picture to be enlarged is thus more equally illuminated; the dust on it is not visible as when the negative receives the sunlight, and the result is infinitely more soft and homogeneous. M. Vidal also remarked that in obtaining enlarged negatives we can always secure a certain amount of transparency by a suitable exaggeration of the time of exposure, we thus avoid harshness. He adds that the positive must always be produced in the camera, and not by juxtaposition, and that we must operate by the wet process, rejecting the dry, which always gives either too much transpareucy or too much harshness, a just medium being very difficult to obtain by this still imperfect process. In the enlarging operation, as in all other photographic operations for obtaining negatives, the time of exposure plays a very important part.

The Marseilles Photographic Society propose to hold an exhibition of enlarged pictures, and giving a gold medal as a prize. The proofs admitted will be life-size portraits, without any retouching. The original must accompany the enlarged picture. Specimens must be sent packed between card boards, or in rollers, addressed to the Secretary of the society, at Marseilles, not later than the end of October next. The jury will consist of the most eminent photographers of Paris.

The society has issued a circular to opticians and photographic apparatus makers, in relation to the subject of photometry, inviting them with a view to facilitating an appreciation of the time of exposure to indicate to each and all whom it may concern, the diameter in millimetres of the aperture of each diaphragm, and to graduate metrically in centimetres, the base or bottom part of cameras from the slide carrying the objective into the farthest extremity the back will draw out. Thus every photographer, without having to provide himself with special instruments, will be able at a glance to verify with precision with what diaphragms and focal distances he operates, facts indispensable to an appreciation of the time of exposure, the want of which is a continual source of error.

Dr. Phipson, in a communication to *Le Moniteur de la Photographie*, points out a disregarded source of sulphocyanide of ammonium—which is entirely lost—in the purification of coal-gas. The sulphate of ammonia, so largely used as an agricultural fertilizer, contains a small quantity, but the sulphocyanide is decomposed by contact with sulphuric acid, and sulpho-cyanhydric acid is disengaged,

which might be condensed and rendered available in photography.

A correspondent of the same journal, referring to an article which appeared in it recently, on collodion without silver bath, states that he has for a long time pursued the same route as M. Poitevin. He employs a nitrate of silver collodion, containing about 1·50 neutral nitrate to 100 collodion, and he converts this nitrate into iodide after the collodion is applied to the glass plate, by immersing it in a weak bath of iodide of potassium; lastly, after washing, he covers the film with a solution of tannin. A singular result sometimes attends this process. The film of iodide thus formed frequently comes off as a fine powder at the moment of withdrawing the plate from the iodide bath, leaving the collodion film as clear as glass. Although the baths were modified in every possible manner, no explanation of the cause of failure could be arrived at, which only occurred on certain days, and never with some collodion. What seemed especially perplexing was, that a collodion devided into two portions gave this anomalous result with one portion, while the other portion worked well. This accident never occurred with an iodized bath containing 50 per 100 alcohol. The editor of *Le Moniteur*, thinks that the cause may be explained by the film of the collodion being too dry upon some occasions when immurred in the bath of iodide of potassium.

NITRATE OF SODA IN THE PRINTING BATH.

Sir,—I have hitherto been in the habit of thinking that M. Van Monckhoven had some knowledge of science, nay, more, that he was well acquainted with it; but now, alas! I find that he is but an "unscientific photographer;" that is, if we accept the celebrated dictum, promulgated some time ago in another journal, that "the addition of nitrate of soda in the printing bath is one of those absurdities in which unscientific photographers alone indulge." Dr. Monckhoven has, notwithstanding, in the pages of the *Journal of the Belgian Photographic Society*, recommended "an economical nitrate of silver bath, which he says produces results equal to those obtained by using the ordinary proportions of that very expensive salt. He dissolves 16 grammes of *pure* nitrate of soda and 8 grammes of nitrate of silver in 100 grammes of water (about 70 grains of nitrate of soda and 35 grains of nitrate of silver to the ounce)." I quote from the *Chemical News* for July 30th, p. 58. Now this is exactly what has been in daily operation in England for more than a year, and is what *soi disant* "scientific" gentlemen have so lavishly abused and condemned as a "piece of photographic quackery," &c., &c., &c.

Dr. Monckhoven says, "to every four ounces of solution add three drops of nitric acid; if the albumen is disturbed, add two or three more." With respect to this addition of five or six drops of nitric acid, I believe it to be an error to suppose that it will be conducive to the paper's retention of its albumenized surface, for (judging from numerous experiments) this small quantity will not have any influence whatever in assisting the so-called "coagulating" power of the bath, nor will its presence enable the bath to perform its office more effectually than when it is absent; moreover, this addition will injure the tone of the print. The paper's non-retention of the albumen—when any such effect is produced by sensitizing—is due to the albumenizer, *and not to the presence of nitrate of soda in the bath*, for its presence promotes the *retention* of the albumen.

Dr. Monckhoven recommends this mixed bath to be used in the ammonia fumigating process; I can state it has successfully been so employed in London for some time past, and therefore allow me to recommend those of your readers who have not already done so, to try this fumigation, when I think they will be surprised at the superiority of the tones produced. No fumigating box &c. is needed to try a simple experiment. Of albumenized paper, which has been sensitised upon this mixed bath of nitrates of silver and soda, take a piece sufficiently large for two pictures and divide it into two equal portions; print upon one of them in the ordinary manner; afterwards, pour about a spoonful of strong ammonia into a glass, and hold the other piece of paper over it, taking care not to touch the glass; keep the paper gently moving over it for a few minutes, so that every part is equally subjected to the fumes, and then print upon this fumed piece from the same negative as before. Instead of the red tone exhibited by the first print when taken from the pressure frame, the second will be a beautiful rich purple, and this superiority of tone it retains in toning, fixing, &c.

Setting aside the knowledge which is taught us by a *practical* acquaintance with this mixed bath, there are *philosophical reasons* for concluding that nitrate of soda *must be beneficial in the printing bath;* I am sorry to say that I have not yet had time to furnish you with them, but, as the old adage tells us, "better late than never," I will do so as soon as I can find leisure.—Yours truly,

George Price.

18, *Mornington Road, New Cross Road, Deptford.*

INTENSITY IN THE FIRST DEVELOPMENT OF THE NEGATIVE.

Sir,—To obtain a brilliant print, vigorous and bold, standing out, as it were, in relief from the background, yet soft and delicate, and of good tone, requires, it is scarcely necessary to say, a combination of several qualities in the negative. Albeit, it is possible to produce from a poor negative a tolerable print with careful printing; *good* negatives can alone yield really good prints.

To obtain a brilliant, bold, and vigorous negative is, as a matter of course, the primary object of all photographers, and it is well known that it is impossible to produce a thorough good negative, unless the foundation be laid in the first development; much good we know can be done by the use of intensifiers, yet, unless we get detail, &c., to work upon, our efforts for first-class results are in vain.

To obtain sufficient intensity in the first development of a negative, in summer, is frequently a difficulty to the operator, notwithstanding his chemicals being in good working order, the model well lighted. I have known some photographers to say "that they cannot get their negatives *thin* enough, and the want of intensity they never know;" others complain constantly of feeble results. Much of this depends on the situation of their studio for example, how the light falls on the model, the "stop" used in the lens, &c. &c.

I believe also in non-actinic weather, in the height of summer, as described by Mr. W. H. Warner, of Ross, *vide* Photographic News, July 10th, 1863. He there states: "We can get no picture without exaggerated exposures, and immensity of intensifying." Again, in the News of July 17th, 1863, Mr. James Munroe says, in reply: "In the middle of the day the negatives required a great deal of intensifying." And other gentlemen, too numerous to mention, complain of the want of intensity: moreover, they all emphatically state *that their chemicals were in first-rate condition.* Therefore it is somewhat difficult in the height of summer to obtain throughout the day *a good class of negatives*, yet there are *ways* and *means* whereby to obviate the above difficulty; thus it is my idea (in drawing the reader's attention to the following hints) to *remind*, with respectful courtesy, operators acquainted with them, and to teach those who do not know.

With regard to non-actinism in summer, the extreme dryness of the atmosphere is attributed by some gentlemen to be the cause—no doubt they are right—for example, Mr. Noel E. Fitch complains in the Photographic News of August 7th, 1863, of the want of intensity in his negatives. The floor of his studio is paved with red tiles. He says: "To alleviate the heat, the other morning I poured through the 'rose' of a watering-pot a large quantity of water on the tiles, and, although in a few moments the water was

absorbed, the evaporation continued for several hours: to my gratification, on taking a negative, it not only came up dense and standing out from the glass, but required no after intensifying from the iron developer." He further states: "I do not absolutely assert that the dampness in the air of the room had anything to do with the improvement, but on trying the same thing this morning I met with the same pleasing results." Of course, every photographer cannot resort to the above expedient, therefore it behoves him to study well to keep his chemicals in proper condition, the arrangement of light, &c. &c., which will enable him to procure satisfactory negatives; for example, if his collodion is slightly acid (and many of the commercial samples are) the bath should be strictly neutral, the coated plate should not be *too dry* when inserted in the bath, or too wet. Again, if the bath is *new* the plate should not be kept in too long, or taken out too soon if the bath is *old*; these little things are the foundation of intensity. Again, it is of importance not to use the collodion freshly iodized, nor iodized too long; experience will teach the best time, as it would depend upon the sample of collodion used. Again, the strength of the developing solution should be studied according to the exposure given, and in flowing it over the plate dexterously, so that the free nitrate is not driven off before it, as it has been before stated in the NEWS, and is of great importance in obtaining intensity.

There is one important point which, no doubt, is frequently overlooked—one which is the source of great evil, viz., the presence of actinic light in the dark room: I do not say "white light," which, of course, would be strictly prohibited, but the actinic rays which pass through *some samples of yellow glass. I believe this to be the cause of "thin" negatives more frequently than anything else.* The proper lighting of the model, the colour of the background, and the position of the lens is also of importance; the *lens should be entirely in the dark*, the background and accessories *not too light in colour*, sufficient amount of light, and no more, should be *concentrated* on the model; nothing is more conducive to "flat" pictures than an excess of reflected light. The following arrangement in the studio, for concentrating the light on the model, and preventing reflected light to enter the lens, will be found exceedingly useful where the studio has plenty of side light:—

Fig. 1.

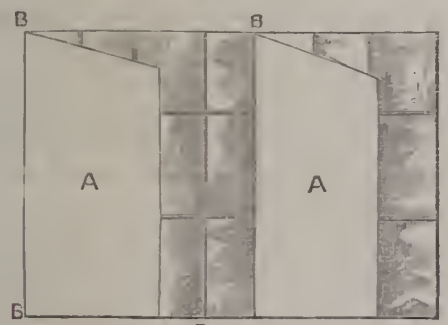


Fig. 1.—Side of studio, A A, wooden shutters, or rather screens (they can be made of all wood, or canvas stretched on frames), opened so as to admit light, attached to the side of studio by hinges, B B; the side of the screens facing the lens should be painted black or brown,* the other side facing the glass white, or what I find much better, distempered in *rich ultramarine blue*, which absorbs the light as it enters, and partially corrects the rays. The above arrangement for the side light of a studio is the most useful and economical that I am acquainted with; it dispenses with curtains, blinds, &c., looks well, if nicely painted, and the light can be subdued or thrown strong on the model, at the will of the operator, as it is somewhat similar to opening and shutting a door: in short, by opening one wider than another, &c. &c., various pleasing artistic effects of light can be produced.

In concluding this paper I would, with all courtesy, entreat the operator and amateur to study to obtain the negative in the *first development*. The above hints I find useful in everyday practice; some operators are skilful enough to obtain a tolerable negative by means of intensifying from what would otherwise be a "weak, flat, poor" thing; but give me the negative that develops up "rich" and "plump," requiring only a slight dash of pyro and silver to alter the colour of the deposit. D. DUNCAN.

* As, of course, they should not come within the field of the lens, the colour is not of much consequence; for example, they could be grained, &c.

Photographic Notes and Queries.

CRACKING OF FILMS.

SIR,—I read with considerable interest the article on the "Cracking of the Film" in last week's NEWS; I have frequently thought of writing to you on the subject, but have omitted doing so.

The explanation given as to the cause may no doubt be correct, yet I incline to think that the following remarks may be a "chink" to let in a little light. I had been in the habit of thinning my varnish with methylated spirits, sold at the oil shops under the name of "Finish," and I can safely say that during the time I used it, I never met with the cracking of the film.

We have our chemicals direct from manufacturing chemists. On one occasion I ordered a gallon of methylated spirits to be sent with the other things: I noticed when we received it that the bottle was labelled "Rough Spirits of Nitre;" but as it did not appear to be any different to what I had used before, I did not take any notice; a portion was used in cleaning plates, and the remainder to thin the varnish. Now the film of every negative varnished at that time has since cracked in peculiar fantastical ways.

Speaking to the gentleman of whom I ordered the methylated spirits as to the cause of the bottle being labelled "Rough Spirits of Nitre," he said, "We cannot sell it unless it contains something, and we generally put a "drop or two" of nitric acid in. I saw at once the cause of the film cracking; since then, instead of having nitric acid in the spirits, I have a little gum camphor, and I do not know what it is to see anything of the kind now. The "Finish" sold at the oil shops is used largely by French polishers, and contains a gum, which of course would not be injurious. I do not say, sir, that it is the custom of chemists in general, to retail their methylated spirits containing nitric acid, for if so, the cracking of the film is at once apparent, as many photographers thin their varnish with spirits obtained from the chemists. In conclusion, I do not know whether the above remarks may be worthy of publishing, so that some of your numerous readers may be able to throw a little light on the matter, as it is one of importance; but I merely write to ask your opinion.—I remain, sir, yours respectfully,

DAVID DUNCAN.

Brighton, August 8th.

[We think it is probable that our correspondent is labouring under a misconception. It is probable that he was informed that the methylated spirit contained a few drops of nitric *ether*, or probably nitrous ether, and not nitric *acid*. "Spirits of nitre" is the commercial term by which nitrous ether is often designated. This ought not to effect the varnish at all. Methylated finish usually contains shellac, and the same proportion of the finish would not dilute the varnish to the same extent, which methylated spirit alone or with a little "spirit of nitre" would. How far dilution in any degree would affect the tendency to cracking, we cannot say.—ED.]

TREATMENT OF PHOTOGRAPHIC PAPERS.

SIR,—In Nos. 305, 306, and 307 of your esteemed paper, there are some excellent articles translated from the *Bulletin Belge*, on the "Treatment of Photographic Papers," enume-

rating the different kinds of papers to which they respectively apply. It happens, curiously enough, that the names by which the papers are designated, as well as the directions for using them, correspond so closely with those of Mr. Beyrich of Berlin, that I was induced, as his agent, to make enquiry of him, and find that the papers referred to in those articles are really those which are manufactured in his establishment at Berlin. I now mention this because these articles may serve as the best guide to photographers using the papers in question.
—Yours, &c., C. TRUBNER.

20, *St. Dunstan's Hill, August 4th*, 1864.

Talk in the Studio.

PHOTOGRAPHING POLISHED SILVER.—The highly polished surface of ornamental silver vessels is well known to occasion considerable trouble to the photographer, not only from the brilliant mass of light reflected, but from the number of irregular reflections from surrounding objects, the effect of which materially interferes with the due rendering of the design. Some very unsatisfactory results of this kind being obtained by a photographer for a large firm at the West End, the manager of the artistic department, an Irish gentleman of great resource, exclaimed to the photographer, "Why don't you put a piece of ice in the jug?" The question was solved in a moment. A piece of ice in the silver vessel would rapidly cool it, and so cause it to condense vapours on its surface from the surrounding atmosphere. This would just sufficiently dim the excessive lustre to render a good photographic representation possible. Our readers should not forget the hint.

BROMIZED COLLODION.—In a recent paper by Major Russell, read before the Liverpool Amateur Photographic Association, he intimates that in using collodion containing a bromide only for the tannin process, he has found it necessary, to prevent fogging, that the excited plate should contain a trace of unaltered bromide of cadmium. He is uncertain whether it is better by a short immersion to leave a portion unchanged into bromide of silver, or to allow the whole of the bromide in the collodion to become bromide of silver, and then add a little bromide of cadmium in a final wash. He believes the conversion of the whole of the bromide in bromo-iodized collodion sometimes cause fogging.

ANOTHER USE FOR NITRATE OF SILVER.—The most important article in the laboratory of the photographer, has long had important pharmaceutical uses: it now finds another. Dr. Socquet, according to Galignani, considers it a specific for that distressing malady of many persons with excess of brain-work, nervous head-ache. The formula is thus given: nitrate of silver 3 centigrammes, salammoniac 6 centigrammes, extract of gentian *quant. suff.*, for each pill. It is stated that very obstinate cases of long standing have been cured. The dose is two or three pills, fasting in the morning, at mid-day, and before going to bed. On examining the formula, it appears to be chloride of silver which is required, with a little excess of nitrate.

To Correspondents.

J. J. D.—The size of the camera to be used with any given lens is generally regulated by the focus of the lens, and the size of the pictures to be taken. To illustrate: suppose your portrait lens have an equivalent focus of eight inches, the back focus will, probably, be about six inches, therefore the camera must close up sufficiently to allow the ground glass to come within six inches of the lens. It may extend as much as you like: if you wish to use it for copying objects the full size it should extend sixteen inches, but unless you require it for such a purpose, that amount of extension is unnecessary. As a portrait lens of eight inches focus is not intended to take portraits of a larger size than half-plate, the camera need not be made for larger plates, although you may, if you choose, have it made for plates eight inches square. 2. The use of sliding, or bellows bodies, is much a matter of taste. If you want considerable extension, we should prefer the bellows body.

M. L.—If your negative varnish sink into the film, leaving a dull, dead surface in the lights, but clear and bright in the shadows, it is probable that it is a little too thin.

T. B. HUTTON.—We shall be glad to hear the further progress of your efforts to repress piracy. We shall be glad to receive the communication you mention. The subject is one of considerable interest.

B. J.—The portrait is very excellent; round, vigorous, and well modelled. The definition in the lower part is a little faulty from the use of a short focus lens with very full aperture.

F. M. R.—A saturated solution of gallic acid contains about four grains to the ounce. The action is more energetic if the solution be used hot.

POST TENEBRAS LUX.—We did not enter into any discussion on the form of stops in our "Hints," simply because we were making suggestions as to the proper use of existing apparatus, in which the form of the stops is very properly circular. In regard to your two questions as to the influence of the form of stops with single lenses, first, the shape of the picture or field of light is, of course, affected by the shape of the stop. The reason you have a circular picture, using the full aperture of the lens, is, that the tube projecting in front of the lens bounds the light admitted by a circle. If you bound the light admitted by a rectangle, you will not get a perfectly rectangular picture, as the tendency of the lens is to bend the lines, but you will not get a circular picture. Try the experiment as to the effect of the shape of a stop, using a small oblong stop or a slit; you will find the shape of the field of light produced will approximate to that of the stop, and will be nearly oval. 2. The effect on the image will not, we think, be beneficial. A square stop will cause the image of a round point of light to be square. Try placing a square stop in front of any converging lens, and using it as a burning glass, bring the image of the sun to a focus; you will find the image will be square, or nearly. Again remove your lens from your camera, cover up the aperture in the flange with brown-paper, and make in the paper a pinhole. Present this to a well-illuminated object, and you will get a perfectly formed image on the ground glass with a lens. Now elongate this pinhole into a slit, you will then find the image blurred, and spread somewhat in the direction of the aperture. Some very good authorities, amongst whom we remember was Mr. Lake Price, have advocated oblong stops, but, with all due deference to the opinions of good men, we think they are in error. Regarding your remarks on another opinion expressed on this subject, we are not fond of imputing ignorance where it is possible there may only have been thoughtlessness or oversight. For the rest, we are obliged and complimented by your remarks.

DISHEARTENED.—We could have judged better as to the probable cause, if we had had more details of the operations. Sometimes similar looking markings will be found on dry plates, as a consequence of commencing to wash away the free nitrate with hard water in a stream, instead of getting rid at least of all surface silver solution, by washing in a dish with distilled water. Sometimes we have seen marking somewhat similar arise from some irregularity in the drying.

AN INQUIRER.—There are various modes of printing photographs on ivory. Some of the so-called coloured photographic miniatures are simply painted miniatures, a strongly-printed photograph having been attached to the back of the thin semi-transparent sheet of ivory to guide the painter. Others are really printed in silver. Others by means of salts of iron. There is a description of the method of printing on ivory, with silver, on p. 171 of the PHOTOGRAPHIC NEWS, vol. v., and a process with the salts of iron on p. 115 of the present volume.

A YOUNG MAN FROM THE COUNTRY WHO CAN'T GET OVER MEAL.—What can we possibly do to help you? You tell us that you have tried almost every plan in every book, and all the plans in the NEWS, and still cannot succeed satisfactorily in toning. If we tell you in return, that we have tried almost all the recipes we have seen, and succeeded more or less with all, we fear that will not help you. We have no secret to ensure success, and we cannot conceive how the plans which, in our hands, and in those of thousands more do succeed, should fail with you. Is it possible that you try too many, and all of them hastily and doubtingly, and thus fail? With the ordinary acetate bath of 30 grains of acetate of soda to 1 grain of chloride of gold, and 6 or 8 ounces of water; or with the simplest lime bath, consisting of 1 grain of chloride of gold and 1 grain of chloride of lime in a similar quantity, provided the materials are pure and the gold nearly neutral to begin with, and the solution kept forty-eight hours, we don't see how failure is possible. Try again with either of these; try carefully, and let us know the result.

J. H. S.—Your difficulty, probably, arises from getting the plate heated irregularly. It is important to have the plate of a uniform warmth, in order to get an even film of varnish. In varnishing, we always instinctively apply the back of the plate to the back of the hand, before applying the varnish. If we find that the plate has a uniform temperature all over, which can be borne by the back of the left-hand without inconvenience, we can apply the varnish with safety. If the heat in your stove is small, but concentrated, hold the plate at a greater distance, and move it about. 2. Your second difficulty we do not quite understand. It is, probably, that the film had dried round the edge, and so caused the results which followed.

12 O'CLOCK.—If you use the same toning bath over and over, it is very possible that it will rapidly lose toning powers, not simply from getting exhausted, but from the introduction into the bath of something which tends to the reduction of the gold, making the bath useless the next time it is tried. If, for instance, your prints are not very well washed before toning, any trace of nitrate of silver tends to reduce chloride of gold. It is better in many cases just to use sufficient toning solution for the prints in hand, and not to use it over and over again.

A. S. F.—The annual subscription for the PHOTOGRAPHIC NEWS by post is 17s. 4d., the half-yearly subscription half that sum, and quarterly one-fourth, paid in advance to the publisher, Mr. Thomas Piper.

CAP. BONAMY.—We are obliged by the further particulars, which we shall publish next week. We shall have pleasure in receiving the prints.

J. M. B.—It is useless to register a photograph after any copies have been sold, as the registration in such case affords no protection. 2. A person can register a copy of another person's original and unregistered photograph, but he acquires no copyright by doing so, and simply wastes his time and money. 3. In the case you mention, the registration is not of the slightest use to either party, and no copyright can be acquired in the photographs.

St. John, Vincent, and several correspondents, in our next.

Photographs Registered during the Past Week.

MR. WILLIAM AMPHLETT MOSS, Netley,
Instantaneous Stereograph of Ceremony of Laying Foundation Stone of Crimean Memorial at Netley Hospital, by H.R.H. Prince of Wales.

MR. WILLIAM HECTOR, High Street, Crediton,
Photograph of Rev. C. F. Smith, Vicar of Crediton.

MR. LAMBERT WESTON, 17, Waterloo Crescent, Dover,
Photograph of Captain Winslow, commanding the U.S. Ship of War "The Kearsage."
Photograph of the Deck of the U.S. Ship of War "Kearsage."
Photograph of Capt. Winslow and the Officers of the "Kearsage."

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 311.—*August* 19, 1864.

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THE PATENT BLINDS.

THERE are two important questions which arise out of the recent dispute in reference to Mr. McLachlan's patent blinds. The first, and by far the most important, and which does not hitherto seem to have received any attention, is:—Are the blinds efficient and valuable? The second, or second and third, which only become interesting in case of an affirmative answer to the first, is: To what extent is the patent valid, and what constitutes an infringement of the rights of the patentee? If the general principle have but a questionable value, and be capable of but very limited application, the interest in the legality of the patent is narrowed to a very small compass, and ceases to be a matter of general concern to photographers. If, on the other hand, the principle were an important and valuable one, capable of general application and calculated to improve the quality of photographs, and diminish the difficulties of photographers, the question of Mr. McLachlan's claim would be well worth discussing, and, if necessary, testing at law at the general cost of photographers. If it were then ascertained that he had made a discovery or invention of distinct value to the art, we apprehend that few persons would begrudge him the legitimate remuneration for his labour and ingenuity. If, on the other hand, it were decided that his invention involved nothing new, that he had merely appropriated a principle which was common and public property, photographers would be the gainers by a contest which brought under their attention, and gave them permission to use, a system of blinds hitherto but little known or valued.

There is one difficulty which presents itself at the outset of such a discussion. Whilst we are anxious to discuss the efficiency or value of these blinds in the abstract, the fact stands before us, that we are really discussing the value of something which Mr. McLachlan regards as his private property, and which, if depreciated in value, is so much loss to him. The question is, however, one of public interest, and we can simply discuss it in that aspect, merely expressing our desire at the outset to avoid any offence to the feelings of individuals. We may say at once, then, that for general purposes connected with the management of light in photographic studios, we regard these blinds as wrong in principle, and worthless in practice. When we first read Mr. McLachlan's specification, about two years ago, we were unable to perceive anything sufficiently new in principle, or of such general and valuable application as to justify a patent; but as the specification was, as is the wont of such documents, not very clearly stated, we contented ourselves with the belief that there was something more in the matter than was clear on the surface, the details of which we should learn at the earliest opportunity. With this view we have from time to time obtained information from gentlemen who have had the blinds in use, or seen them in operation, from whom we learn that our own first conclusions were strictly accurate and duly appreciative.

In the first place, taking the invention on its own claims, it is not of such general application as to give it anything like universal photographic interest. It is to keep the direct rays of the sun out of studios having such an aspect as will bring the sitter usually into direct sunlight. "My invention consists," says the specification, "firstly, in a method of preventing the direct rays of the sun from falling upon the sitter or other object to be copied, and of modifying and directing the light as occasion may require." As but few studios are built with a south or southerly aspect, the aim of the invention, useful enough if successful, is but limited in application. Perhaps the best idea of the mode in which this object is to be effected can be gained by fancying large venetian blinds to be attached to the glass roof of the studio, the bars being very broad and placed at great intervals. The description of this part of the invention in the specification runs:—"I cause strips of wood, or other suitable material, to hang downwards from the roof at such a distance apart, and of such depth as to shut out the direct rays of the sun. These strips, if desired, I hang upon centres, so that they may be inclined to any angle." In this our readers will see at once a description of the Venetian blind, a series of strips of wood of a given width, and at a given distance apart, so working that the strips can be placed at any angle. Mr. McLachlan's Venetians are made of broader strips of wood, which are placed at a greater distance apart than those in our sitting rooms; the strips are generally from about nine inches to twelve inches in width, we believe. There is sometimes an addition to the Venetian blinds, however, in the shape of narrow strips hanging cross-wise between the longer ones. The same principle is also applied to the side lights.

Now, whilst Venetian blinds are most grateful and valuable in the sitting-room, to shut out the direct rays of the sun, it happens, as a rule, to be quite unimportant how much light is shut out at the same time; whilst in the photographic studio this becomes a question of vital importance. And here arises our objection to Mr. McLachlan's method. It undoubtedly shuts out the direct rays of the sun, but at a sacrifice of light far too great to be practised by the photographer. It not only cuts off the direct rays of the sun, but it cuts off a large portion of the general or reflected light coming from the sky. An admirable test for forming some idea of the amount of light reaching the sitter is to take his place and look upwards; the amount of light or sky which can be seen is the amount which is active in delineating his face, &c. It has happened that several of our correspondents have consulted us upon the cause of the extremely long exposures they were compelled to give with a large space of glass roof and sensitive chemicals in order to obtain pictures. On inquiry, we have found that the roofs

were somewhat low, the panes of glass somewhat small, and the sashbars running transversely. We have, in each case, suggested this experiment of standing in the place of the model, then looking upwards to the source of light. In one case, the photographer was astounded to find that he saw no sky at all, the sashbars just projecting so low as to cut off all direct light from the face. This at once explained the long exposures, and a remedy was quickly found and applied. So it was, in a modified degree, in several cases. And so, we believe, it will be found in the use of these blinds. This was our judgment formed in the abstract, and on inquiry from those who have used the blinds and seen them in operation, we find that this is the practical result. The exposure is, under the best circumstances, increased one-third, and, in some instances, we understand half, as a consequence of the use of these blinds.

Then, as to the use of the blinds to direct the light, it is obvious that in whatever angle they are turned, unless each strip were turned at a slightly different angle, so as to make the direction of every ray admitted converge towards the sitter, they must necessarily direct the light where it is not required. The rays admitted between two or three of the strips would doubtless reach the sitter direct; but the rays admitted between the majority of the strips would be simply directed to the ground of the studio, where they are worse than useless. We remember, some time ago, receiving a very enthusiastic description from an eminent photographer of the capabilities of these blinds in throwing the light in any direction: on inquiry since, however, with a view to obtain the best evidence, we ascertain that he has abandoned their use.

There is another effect of such blinds too important to be overlooked, although its action may not always be immediately apparent. One result of these strips is really to cut up the light into a number of small sources, and thus cause confusion of shadow. It should be borne in mind that light travels in straight lines, and that it will not turn round the corner of each strip when it has passed, and join so as to form one common source again. It is an admitted fact that a large number of sash-bars is injurious from this cause, and Mr. Rejlander attributes much of the value of his light from a comparatively circumscribed amount of glass, to the fact that this small amount of glass is not cut up by numerous sash-bars. The evil of cutting up the light is very easily demonstrated, but, we trust, is sufficiently familiar to our readers to require no further enforcing here.

As to the best mode of excluding direct sunlight from studios with a southerly aspect, we may here remark that we believe the best result, with the least loss of light, is secured by the use of thin semi-transparent blinds. Probably the tracing linen, suggested by Mr. Cole a few months ago, will be found to answer best. But we have seen some most admirable results produced by direct sunlight through an ordinary white calico blind. Mr. Blanchard obtains some of his finest effects in portraiture by direct sunlight passing through a blind of tissue paper. We believe that less absolute loss of light will be sustained in such cases than by the use of the large Venetian blinds in question.

Thus far, then, our conviction is borne out by inquiry and examination that these blinds effect their work at a cost of light too great to be practically useful, and that they are, under any circumstances, of but limited application. If this be the case, the legality of the patent becomes a matter of comparatively minor importance.

On this part of the question we fear that individual opinions, lay or professional, are of little importance. Mr. Webster, the eminent patent law barrister, has given his opinion to the effect that the patent is invalid, or at least invalid in its chief claim. But this opinion, whilst it may give courage to those who are disposed to litigate the matter, can do nothing more; it decides nothing. So far as we can see, the general principle is that of Venetian blinds, and free, therefore, to everybody; but the law may decide quite otherwise. Mr. King thinks the bliuds most like louvre boards; if this were the case, we fear it would only strengthen Mr. McLachlan's claim, inasmuch as louvre boards being intended simply for ventilation, these being for lighting would constitute a distinctly new application of an old idea. Mr. Mabley, a clever photographer and experienced patent agent, in an intelligent letter in a contemporary, puts the patentee's side of the case, without, however, pledging himself to any opinion of the validity of the patent in question, merely enforcing what is too often forgotten, the rights of patentees, and expressing his conviction that Mr. Brothers' arrangement really constituted an infringement.

Our own conclusion on the subject is, that to nine-tenths of the photographic community, the validity of the patent is not a matter of much interest, as the blinds would be of no service to them whatever. To the few to whom any adaptation of the principle involved in the patent would be valuable, the only mode of arriving at a definite conclusion is to form a common defence fund, and accept the challenge which Mr. McLachlan has very fairly and straightforwardly made, to try the case in an action against Mr. Brothers. All those who conceive they have any interest in the question should subscribe, as it is unfair to expect any individual to defend, at his own expense, an action for the general benefit. But as, rightly or wrongly, the fact thus stands, that a decision at law alone can settle the question of legality, it is unwise to enter into a wordy controversy, often involving much asperity of feeling, but which decides nothing.

PERMANENCY OF PHOTOGRAPHS.

In the discussions which have from time to time taken place on the permanency of photographic prints, and the best means of preventing fading, it has generally happened that when the importance of careful washing has been insisted upon, a few of those anomalous and paradoxical cases, which certainly do exist, have been quoted to show that in the earliest days of photography, when a few minutes' washing in two or three changes of water were considered quite sufficient for the purpose, many of the prints had remained in good condition, whilst later and more carefully washed prints had become hopelessly faded. We say such cases do certainly exist, but their history is too vague to admit of any theory being deduced therefrom; still less to admit of any argument in favour of imperfect washing being based thereon. Whilst it is quite clear that some prints which have had long washing have faded, it is by no means clear that all the other conditions of permanency have always, in such cases, been observed as well.

With the advent of carbon printing, it is possible that considerations of this kind will lose much of their interest; but as it is tolerably certain, notwithstanding the great promise of a simple, certain, and satisfactory carbon process shortly becoming more generally used, that silver printing will still, for some time to come, continue in pretty general use, it is tolerably interesting to know how far the processes in existence give promise of permanency, and also what best tends to secure the desired result.

A few days ago we received some details of a very interesting examination of a very complete collection of photographs, which had been preserved under the most careful conditions from the earliest days of photographic printing to the present time. It is well known to many photographers that His Royal Highness Prince Albert was deeply interested in photography, and made an extensive collection, from the first dawn of the art, of all kinds of specimens, having a fine and discriminating taste in making his selections. Her Majesty the Queen is also an admirer and patron of the art, and the royal collection has been kept equally perfect in her hands. With her usual scrupulous care and minute interest in such matters, her Majesty recently gave instructions that the whole collection of photographs, from the beginning, should be examined by a competent photographer, in order to report upon their condition as to permanency, with a view to the

replacing of all copies which showed signs of fading. We are glad to be able to state, that the result of this examination was much more satisfactory than the general impression, as to the want of permanency in silver prints, would have rendered at all probable. Very few of the prints, indeed, were at all seriously faded, and many not at all. This collection has been derived from all kinds of sources, and includes the best works of all the best photographers, both English and foreign, who have flourished during the last twelve or fourteen years, and consists, not merely of commissions executed for the Queen or the Prince, but also of such as were published and sold in the usual way. The perfection of their condition indicates the fact that even ordinary commercial photographs, when kept with care, stand well, and are less liable to fading than is often supposed by those who preserve them carelessly.

Another very interesting fact is illustrated during this examination. The pictures which have faded are, almost without exception, by foreign photographers; whilst those of English photographers, taken ten or twelve years ago, are in perfect condition. This is, probably, due to two facts: in this country water is generally plentiful, whilst on the Continent it is frequently very scarce; and we are glad to add that in this country, notwithstanding its commercial character, we believe that conscientious honesty in washing prints has been the rule, whilst, on the Continent generally, a much slighter and more hasty mode of dealing with the matter has prevailed.

The conclusion to be deduced is very encouraging. With copious, careful, and conscientious washing, it is possible to secure a high degree of permanency, even for silver prints, the reproach to the art as to want of permanency having been derived, in many instances, from the carelessly produced exceptions, rather than from a consideration of the mass of pictures properly treated and carefully kept.

ANOTHER MODIFICATION OF THE CARBON PROCESS.

Mr. Blair, of Perth, whose name is well known to photographers in connection with various valuable communications to the *Photographic Notes* on the carbon process, gives in the last number another modification, which, singularly enough, in general principle, is almost identical with that described in the Photographic News of June 24th, differing, however, in some points of detail. The mode of mounting which he recommends is similar to that communicated to our pages by Mr. Henderson, in May; but instead of coagulating the albumen with alcohol, like that gentleman, Mr. Blair effects the operation with boiling water. A question will here arise, which can only be settled by repeated experiments, as to how far boiling water will have a tendency to make the bichromated gelatine totally insoluble, and thus render it impossible to develop the picture. Mr. Swan ascribes much of the insolubility which experimentalists have found in the sensitive films to the use of water too hot at the commencement of development. If this be the case, the application of water at boiling heat, or hot enough to coagulate albumen, would risk being fatal to the solubility of the gelatine. As we have said, however, practice will readily determine this point. Mr. Blair thus describes his process in the *Photographic Notes*:—

Take a piece of glass, zinc plate, smooth board, or any other hard substance with a flat surface, gum down upon it a bit of common smooth paper, cut to the size, and previously damped and blotted off, to ensure its full expansion. With a brush, or the finger, spread also a little gum mucilage thinly on the upper surface of the paper, so as to fill up its pores. This facilitates also the removal of the paper at a future stage of the process. Now, while still damp, pour over it, or spread upon it, a mixture of lukewarm gelatine and carbon, or other pigment, and when this has *set*, put it aside to dry. Prepare as many of these as you please, and use up your gelatine mixture while in good condition. When dry, it will keep for any length of time. A little salt, or sugar, added to your gelatine may make it more soluble, and more easily permeated afterwards by the sensitizing solution.

At your convenience, when you want to take a picture, dip one of your plates in a bath of bichromate of potass for a minute or so, just till the bath slightly penetrates the surface of the gelatine. The bath should not be very strong. Let the plate drain, and dry in the dark, as you would do with a silvered paper; expose under your negative, and take back the plate to your dark room. Now pour a little albumen (previously beaten and settled) on your exposed surface; spread albumen also on a piece of clean white paper (previously damped and blotted off), lay the two albumenized surfaces together, avoiding air bubbles; let it drain a little, or press it gently under blotting-paper, or in a press, and then plunge the plate quickly into boiling water. So soon as the albumen is coagulated (which it will be very quickly), take it out and put it into *warm* water. The two papers, with the gelatine between them, will soon leave the plate. If the albumen make them hold at the edges where it has run over, they should be relieved by a knife, and thereafter the *first* paper will also soon be detached. The picture adheres to the second paper, and is easily washed up.

This process has two advantages of some importance. First, it gets quit of the difficulty of keeping the gelatine long in a sensitized state, whereby it hardens in the dark and becomes useless. Second, it also gets quit of the collodion used in M. Fargier's process and Mr. Swan's, whereby some expense is saved; and not only so, but the picture does not run the same risk of cracking and splitting in the process of drying as when collodion is used, various specimens of which, completely spoiled by cracks, were lately shown me by Mr. Tunny, of Edinburgh. In these specimens the collodion had given way at the edges of the high lights, when it was unsupported by any body of gelatine.

Paper can be prepared as above, and kept in stock, ready to be sensitized at any time, without being *gummed* to the glass, just as in the process some time ago announced by me for printing on plain paper. This makes it especially important to amateurs. In that case, the glass may be gummed at the edges, or round the margin, but should be slightly waxed in the centre, to keep the paper from adhering.

After a few words on Fargier's process, he adds:—

The above modified process, which I now make public, is more nearly allied to M. Fargier's than to Mr. Swan's, and, I think, I would be fully as much entitled to claim a patent for it, as Mr. Swan has for his. But I make all welcome to use it who choose, and if they do so, I believe they will run no risk of infringing any patent, while they will find the results quite satisfactory. It is perfectly unjust that a process which has been gradually developed by the labours of many individuals, each adding his improvement from time to time, should at last be locked up by some person who happens to give some final or improving touch or modification to it, involving no new principle, or discovery, or application of science, but a simple variation in the manner of manipulating.

On this point we fear Mr. Blair is too late in the field, as we understand that an analogous process is included in Mr. Swan's patent.

Mr. Blair concludes his paper, by remarking that the albumenized paper used for mounting might be allowed to dry, and then be coagulated with alcohol. He here overlooks this fact, that dry albumen is not coagulated by alcohol.

PHOTOGRAPHIC PORTRAITURE.

BY T. R. WILLIAMS.

[Our readers, who have from time to time seen allusions in our pages to Mr. T. R. Williams, as one of the ablest masters in photographic portraiture, will be gratified that we have been able to induce him to give a brief *resumé* of his daily practice. It will be seen that it fully bears out a favourite apothegm we have often repeated, that success depends as much on the man as on the method; but it will also encourage young students to persevere in the practice of the best known methods, without hankering after secret processes as means to success.—Ed.]

In making a few observations on photographic portraiture, it is necessary to premise that I have no especial novelties to bring forward, the processes I employ, and my mode of operating are already familiar to the readers of the Photographic News. My chief object, beside repeating a brief and succinct statement of my own operations, is to enforce one or

two points of importance, and to give especial emphasis to the fact, that success in photographic portraiture is not due to the possession of occult formulæ, or to the employment of secret methods, but simply to the judicious application of the information open to everyone, the use of the best materials and apparatus which can be obtained at any price—cheapness in either photographic material or photographic pictures being the bane of all excellence in the art—and the exercise of uncompromising watchfulness, care, and judgment, in rejecting everything, negative or print—my own work or that of my assistants—which is not the most perfect that can be produced under the circumstances.

The Glasses should be of the best patent plate, and a stock should always be kept ready, very scrupulously cleaned. They should be as little handled as possible prior to coating. A small shelf in my operating room is kept for one purpose only: the cleaned glass plate is removed from its box and placed on this shelf, leaning against the wall. Between two pieces of millboard, resting on the shelf, is kept a flat camel-hair brush, with which to remove the final traces of dust from the plate before coating. This brush is never allowed to lay about, but is placed between the millboards the moment it is done with, as it is important that it should be perfectly clean.

The Collodion.—I have obtained good negatives with almost all kinds of collodion, by modifying my operations according to their requirements. I use from time to time samples made by various of the well-known makers, and select that for general use which, at the time, gives the best results. I have not found any so constantly good as to be superior to all other; my selection is, therefore, based upon experiment made when required. I prefer a bromo-iodized collodion with a full body, giving a creamy film in the bath, and a fair amount of vigour with the iron developer, without any foggy deposit on the shadows.

The Nitrate Bath.—I have occasionally been much perplexed with the nitrate bath, which, made with purest nitrate of silver to be obtained, distilled water free from suspicion of contamination, and carefully treated in all respects, *secundum artem*, would still yield foggy pictures from the first, or, if working well at first, would break down in a few days and become worthless. The best practical skill I could apply, and the profoundest chemical knowledge I could consult, failed in such cases either to detect the cause or find a remedy. I have but little time for experiment, but I have not found doctoring of much avail in such cases, the simplest plan has been to throw the solution aside for reduction, and make a new bath with a fresh sample of materials. These perplexing cases have, however, been rare.

I now generally use the commercial sample of recrystallized nitrate of silver, made by a well-known refiner, and I find it to all photographic intents perfectly pure. In winter I find that the bath is better for containing 40 grains to the ounce; but, in summer, it should not exceed a strength of 30 grains. It is made in the usual manner, and has a grain or two of iodide of potassium added to each pint of solution. A trace of nitric acid is added just sufficient to turn litmus paper in a few hours. It is better to keep two baths constantly in work, and when they get out of order I prefer making a new one to doctoring the old solution. I prefer to use the plate as soon after it is ready as possible, and an assistant is ready to hand me the plate in the dark slide from the dark room, the moment the sitter is properly arranged.

The operations in the studio appertaining to the management of the light, the arrangement of the sitter, accessories, &c., will require more than a passing paragraph, and I shall, therefore, defer their consideration for the present, and speak of them in a separate article, completing my duty at present of re-stating what appear to me to be very well known and commonplace processes and manipulations.

Exposure and Development.—These two operations depend more on each other than is often thought. The developing solution is, of course, modified to suit circumstances; but that I most commonly use consists of 15 grains of protosulphate of iron, and sometimes the double sulphate, to an ounce of water, with 15 minims of acetic acid, and alcohol sufficient to make it flow freely. The solution is generally used when not more than a few days old. The operation of developing, whilst one of the most important in photography, is just one of those which can be least easily described in words. I suppose that the simple knack of covering a plate with the iron developer, without causing marks and stains, must be difficult to some persons; but I do not fancy that any attempt to describe the method would communicate to them that manipulative skill which can only come from practice, and which seems so natural to the experienced photographer that *he* is inclined to wonder how others contrive to fail. I can only say, that it is necessary to cover the plate with one light sweep of the solution, so that it shall flow in one steady wave, and without causing a stain where it first touches the plate. This done, the continuance of the operation demands the careful attention of the practised eye and experienced judgment. There is less danger with iron development than with pyrogallic acid of carrying the operation too far; but it is very easy to fail to go far enough.

The extent of the development depends, as I have said, very much upon the exposure, and upon the exposure depends much more than appears to be generally believed, the excellence of the negative. The prevailing fault of photographers is under-exposure. It is believed by some authorities, and not without reason, that over-exposure calls into operation an optical cause which induces softness and removes harsh, hard, sharp routlines, by giving time for some of the outstanding rays which are not brought to a perfect focus by the lens, to produce a slight action on the plate. I will not pause to discuss that here, but I repeat very emphatically that upon a full exposure depends more of delicacy, roundness and general harmony than upon any other single operation in portraiture. Upon full exposure depends almost entirely the removal of the coarseness produced by freckles, coarse skin, red hair, wrinkles, scars, &c. The exposure being sufficient, there is little danger, if the chemicals be in good condition, of over-developing. It might almost be stated as a rule that the iron development may be continued in such case as long as there was no deposit on the deepest shadows. The last point is, however, of great importance. the deepest shadows of the picture must present points of almost bare glass in the negative in order to secure brilliancy. If the development be continued so long, or if the condition of the chemicals be such that there is a general reduction or deposit all over the plate, although softness may be obtained, brilliancy is irretrievably gone. If the exposure have been rather short, and the development be pushed to secure detail, it will be impossible to secure a delicate image, the picture may appear both brilliant and full of half-tone, but it will not be really soft and delicate, there will be a slight harshness which the inexperienced eye will be somewhat at a loss to reconcile with the fact that the pictue is full of detail.

This should be remembered as a golden rule, that it is better to obtain half-tone by full exposure than by forced development; that whilst the latter may bring out detail, the former only can give delicacy and softness.

Intensifying.—The appreciation of the real printing value of a negative can only be acquired by experience and long and careful observation. The capacity to see in the various degrees of density in a negative, the gradations of tone it will produce in a print is a most important power, and one which should be sedulously cultivated by the photographic student. Without this power, he may occasionally produce a good negative by chance, but he cannot hope for uniform excellence. This knowledge is absolutely necessary in determining whether a negative needs intensifying, and to what extent the intensifying must be carried, and also to determine the mode of intensifying to be adopted. If the exposure have been in any degree insufficient, or if the image, from the character of the collodion and other circumstances, be

somewhat wanting in vigour, the intensification is effected before fixing, by means of a solution of pyrogallic acid, and a few drops of a fresh 15-grain solution of nitrate of silver. If, however, as is usually the case, the negative possesses good gradations and a moderate amount of force after finishing with the iron, it is fixed, washed, and set aside to be intensified after fixing. This is done before it has dried, and after a very thorough washing, by the application of a 1-grain solution of pyrogallic acid, containing about 15 minims of acetic acid and a few drops of the 15-grain silver solution, applied in daylight. Care is used to avoid stains, and especial care to avoid excess of intensity. As a rule, on holding up a negative to the light, it is possible to distinguish the interruption to the light caused by the sash-bar of the window through the densest part of the face. In intensifying with pyrogallic acid and silver, the aim is really rather to give the grey image of the iron a brown non-actiuic colour, than to pile up much additional deposit, which would often produce coarseness and hardness.

I used for some time the process of intensifying with bichloride of mercury, followed by iodide of potassium, which was practised and recommended by the late Mr. Lacy, whose fine pictures gave such promise of a high career in photography. The process when well managed gave very fine results. It was, however, somewhat difficult at first to hit exactly the right kind of negative for the purpose, and to use the mercury and the iodide in just those proportions which gave the best result; and there was also the unfortunately liability which such negatives sometimes have to grow harder and denser under the action of light. These characteristics induced me after trying it for some time to abandon it for the method to which I have just alluded, which is thoroughly within control, and gives but little trouble.

Fixing.—I always fix with hyposulphite of soda, using a saturated solution in a dipping bath. It gives a negative of more non-actinic colour, and is less apt to destroy the half-tones than cyanide of potassium.

Varnishing.—After a very careful washing, the negative is placed away to dry, and is then varnished with Sœhnée varnish, and is then ready for the printer.

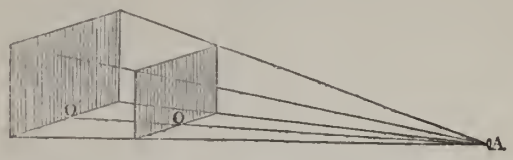
ON THE CONDITIONS WHICH DETERMINE THE EXPOSURE OF THE PHOTOGRAPHIC PLATE.

While it is an easy matter in the studio to determine the proper exposure of a picture, where the sitter is carefully screened from the direct light of the sun, and the light only varies slowly and regularly, the case is far different with the landscape photographer, who is obliged to work in all weathers, and at every kind of subject, from the dark cloisters of a gloomy abbey to the sunlit view of the distant ocean. The following hints are designed to show how and why the exposure requires to be so varied.

The exposure of any plate depends on three principal conditions:—1, the quality of the light; 2, the distance and character of the subject; 3, the nature and aperture of the lens.

1. We will suppose here and in the next case, for the sake of simplicity, that the same lens with the same aperture is used at different subjects in different lights; and afterwards show how the exposures thus determined are affected by varying the apertue, or by using a lens of different construction. The quantity of light varies with the state of the weather and sometimes apparently unaccountably, but usually the following estimate will be found nearly correct. If, for a certain object, the exposure in the sun was one second, were the sun obscured by white clouds so as just to throw a perceptible shadow, the exposure would be about two seconds; were it just throwing no shadow, three seconds; were the day bright without any sun, four seconds; or were it dull, five seconds. This refers to the light during the hours usually devoted to photography, say from 8 A.M. to 5 P.M., in the middle of summer, as before, or after these hours the light is much weaker, and the exposure must be proportionately increased.

2. *Distance of the Object.*—This is a subject which few beginners adequately appreciate, but the following diagram will illustrate its value and importance,



Let A be the camera and lens, O O′ objects at distances A O, A O′, it is evident that the amount of light condensed on the plate is proportional to the volume of the solid pyramids between A O and A O′, that is, as A O^3 to A O'^3, or as the cube of the distance; and since the exposure is inversely as the amount of light, the exposure of any object, the light remaining the same, will be inversely as the cube of its distance from the camera. The result of this rapidly-increasing ratio is obviously to affect greatly the exposures of objects near the camera, while those of objects at a greater distance approximate more nearly to each other. Suppose, for instance, that at the distance of 100 yards the exposure of any object was 1 minute, at 12½ yards from the camera the exposure would be doubled, and at 1½ yard it would be quadrupled, while at a distance of 800 yards (½ mile nearly) it would be halved, and at 6,400 yards (about 4 miles) it would be quartered. This is why we so often see instantaneous pictures of distant objects, while those of objects close at hand are very rare. We have supposed here, that the different objects were of the ordinary character, but where extreme subjects are to be taken—for instance, a white chalk cliff, or a dark ruin covered with ivy—the exposure must be proportionably decreased or increased. How much, a little practice easily shows. In exposing for dark objects, too, it must be remembered that there is far more diffused light in the shadows and dark places, when the sky is covered with light, white clouds, than when the sun is shining brightly in a blue sky.

3. *Aperture and character of the Lens.*—The same lens being used, the exposure will vary *nearly* inversely as the square of the aperture used. For instance, if the exposure with an aperture of one inch was a second, with a half-inch stop it would be four times as long, and so on for other sizes. In most lenses now made by the best makers, the diameters of the stops are so arranged, that counting from the largest stop to the next size, the exposure is doubled, or else altered in some other simple proportion; and though practically the exposure does not follow this rule *exactly*, it gives a very good approximatiou, especially when the exposure is long, and the difference of a few seconds does not matter. Again, a lens of similar construction, but different focus, being used, with equal aperture, the exposure will vary as the length of focus. Suppose, for instance, a landscape lens of 6-inch focus and ⅛-inch stop required one second exposure, a similar lens of 12-inch focus and ⅛-inch stop would require two seconds' exposure. Lastly, a lens of different construction, but equal *real* focus and aperture being used, the portrait lens will be found slightly the quickest, while the single, triple, and orthoscopic lenses require practically almost the same exposure. It is satisfactory to know that these conclusions are entirely borne out by experience; and though it is impossible and absurd to attempt to deduce a mathematical formula for the calculation of the necessary exposure of any subject, in any light, still the conditions here laid down are those which regulate the amount of light received on the sensitive plate, and the skill of the practised artist consists in assigniug to each condition its proper value and consideration.

Photo.

PRINTING PROCESS WITHOUT SALTS OF SILVER.

BY M. OBERNETTER, MUNICH.

I.

This modification of Mr. Swan's process is based upon the employment of the purple of cassius.

In 50 grammes of water, dissolve 0·50 to 0·80 grammes of bichromate of ammonia; in another vessel dissolve 33 grains of pure gum arabic in 66 grains of water; add 10 grains of glycerine, and mix the two solutions. If the gum is not of the first quality, substitute an equal quantity of honey for the glycerine, to avoid crystallization.

The purple of cassius is prepared in the following manner:—Dissolve 120 grains of crystallized chloride of gold in 22 lbs. of water; dissolve 12 drachms of protochloride of tin in 35 ounces of water, and add 6 drachms of a concentrated solution of sesquichloride of iron.

This last solution (of tin and iron) is poured into the solution of chloride of gold, and stirred. The mixture immediately becomes purple. Then add six to eight drops of sulphuric acid to precipitate the purple. To give it a more beautiful colour, supersaturate the solution by means of liquor ammonia. After a few hours wash the purple, decant, and collect it on a filter. We thus obtain nearly 15 drachms. It must be kept moist, so as not to lose its beautiful colour.

Procure also some fine rich lamp black. Mix in a glass four grammes of the purple with a portion of the mixture of gum and bichromate. Add four grammes of lamp black. If they do not mix readily, add some drops of alcohol. This compound is added to the rest of the bichromated mixture. Filter it through linen, and leave it several hours to settle and allow the air-bubbles to escape.

The mixture may be kept several days *in the dark*. It must be protected from daylight.

When used it is poured upon a glass plate, like collodion, at a temperature below 120° Fahr.

The plates dry in from three to five minutes, they will keep three or four days in the dark.

Exposure in the printing frame takes from two to eight minutes in the sun, and from fifteen to thirty minutes in diffused light. The plates may be kept several days after exposure.

Pour a sufficient quantity of collodion upon the exposed film, and dry it until the collodion acquires the consistency of gelatine, cut the edges of the film with a sharp knife, and put the plate in a basin full of water. The collodion with the picture separates from the plate, turn it while under water with the hand or by means of pincers, and place it on a white cardboard, and pour water upon it until it flows off quite clear. Finish by washing it with a mixture of alcohol and water.

To fix the proof on white paper, take some gelatined or albumenized paper, and pour on it a mixture of water and alcohol, and press it on the proof. In a few minutes afterwards it can be separated from the cardboard.

II.

Ammoniacal citrate of iron and perchloride of iron with tartaric acid have not given M. Obernetter good results. He prefers the following mixture.

Distilled water	...	...	100	grammes
Citrate of iron	...	...	5	,,
Ox-gall	...	...	4	,,
Nitric acid	...	...	1 to 3	drops.

This solution is poured on a glass plate like collodion, and dried at a temperature above 120° Fahr.

The exposed film is impregnated with lamp black or any coloured powder, which adheres only to those parts upon which the light has acted. The excess of colour is removed by means of a dry pencil, and the picture is covered with a varnish composed of gutta-percha, one part dissolved in 40 parts of chloroform.

The transfer to albumened paper is made as in the other process.

The dried picture is washed with water containing oxalic acid to remove the yellow colour from the lights.—*Le Moniteur de la Photographie.*

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

I now pass to the description of the *photographic* behaviour of the haloid salts of silver in the presence of other bodies. Upon the influence of these we have already many observations. From the practice of photography, we know that acids diminish the sensitivity of photographic plates, and that moist plates with adherent silver solution are much more sensitive than those from which the silver solution has been washed away. The actions of such bodies upon the different constituents of photographic plates, that is, upon iodide and bromide of silver *alone*, have, however, hitherto been but imperfectly investigated, and I have therefore undertaken the following series of experiments.

1. *Influence of Water.*—Pieces of paper prepared with chloride, bromide, and iodide of silver were half wetted with distilled water, and wiped with blotting-paper; they were then, whilst still moist, exposed for one minute and treated with the developer. *The moist and dry parts of the different papers exhibited nearly the same photographic behaviour.*

2. *Influence of Acids.*—In the experiments previously described, it was proved that acids exerted an influence upon the *photo-chemical co'ouration* of bromide and iodide of silver, and also that those salts, when coloured by light, were entirely, or partially, bleached by acids. The influence of acids upon the photographic properties of the salts is still more striking.

Papers with bromide and iodide of silver were partially moistened with nitric acid of sp. gr. 1·2, and exposed for five minutes in diffused light; the acid was then washed off in the dark, and the papers put for five minutes into a large vessel of water and afterwards developed. Even before the development the lighter colour of the portions moistened with nitric acid was perceptible, and in the developer those spots acquired no colour, whilst the rest became deep blackish grey or brownish grey.

The same experiment was made with dilute sulphuric acid and with acetic acid. It was found that the parts thus moistened acquired less colour in the developer than the other parts. *Consequently acids destroy or weaken the photographic sensitivity.*

Acids act in the same way *after* as well as *during* the exposure. Two strips of paper with bromide and iodide of silver were exposed for a minute and a half, partially moistened in the dark with nitric acid of sp. gr. 1·2, left for five minutes, and then washed with water and developed. The portions moistened with acid were *quite indifferent*, whilst the rest became much darkened; consequently nitric acid destroys the impression produced by the light upon the bromide and iodide of silver. This behaviour again shows distinctly the difference between the chemical and graphic action of light; the former cannot be done away with by nitric acid, whilst the latter is completely destroyed by it.

The same experiment was made with dilute sulphuric acid (1 SO^3, 5 HO) and with acetic acid. In these cases the portions moistened with acid become coloured later and more faintly than the rest. The action of acetic acid was weaker than that of sulphuric acid.

The retarding action of acids is consequently much more strongly manifested in the case of photographic than in

* Continued from p. 392.

that of photo-chemical colouration. Norris has also observed the destruction by acids of the impression made by light upon iodide of silver (Hardwich, *Manual*, p. 52).

As I have already established that during the action of acids upon bromide and iodide of silver no solution of silver takes place, I must conclude that the whole is merely an action of contact.

In photographic processes, however, the action of acid is to be looked on in another point of view, namely, as retarding not only the action of light in the camera, but also the reduction of silver by the developer; for this reason acid is added to the latter in order to enable the reduction to be regulated. This acid, however, will have an injurious action even after exposure, inasmuch as it partially does away with the change effected by light. Hence it is advisable to reduce the quantity of acid to a minimum.

3. *Action of Iodide of Potassium.*—I have demonstrated that, in the presence of iodide of potassium, AgIβ becomes pale yellow and indifferent to light, and also that the grey colouration of AgIβ produced by light is removed again by iodide of potassium. The behaviour of iodide of potassium, with regard to the photographic properties, is still more characteristic. (Only iodide of silver can be employed in these experiments, as the bromide and chloride are immediately decomposed and furnish iodide of silver, with iodide of potassium.) Two pieces of paper, with iodide of silver, were moistened with fresh solution of iodide of potassium, and exposed to light. The moistened parts remained pale yellow, whilst the rest acquired a yellowish-grey colour. The papers were then washed with water and developed in the dark. The parts moistened with iodide of potassium continued perfectly colourless, or yellow, whilst the rest became deep blackish grey.

Two papers, after exposure, were treated with solution of iodide of potassium, left for two minutes, and then carefully washed. The portions moistened with iodide of potassium appeared decidedly paler, even before development; when developed they scarcely acquired any colour, but at length became covered with a pale grey veil, while the parts not moistened with iodide of potassium became very dark. Consequently *iodide of potassium has a destructive action upon the impression caused by light, both during and after exposure.*

Schnauss's results (*Photogr. Archiv*, 1860, p. 115) seem to contradict the last statement. He found that a *moist* photographic plate, washed with water *after* exposure, and then treated with solution of iodide of potassium, and again washed, still developed a picture. This circumstance may perhaps be explained by Schnauss not having experimented with pure iodide of silver, but with iodide in contact with nitrate of silver.

Action of Nitrate of Silver.—In the first part of this memoir it was shown that the haloid silver salts, and especially the bromide and iodide, acquire a much darker colour when exposed beneath solution of nitrate of silver, than by themselves. In a similar manner nitrate of silver heightens the photographic sensitivity.

For the demonstration of this action, papers with chloride, bromide, and iodide of silver, and clean paper, were partially moistened with nitrate of silver (1 AgO, NO^5, 10 HO), and exposed for from one to five minutes. A deeper colouration of the parts moistened with nitrate of silver was soon observed. All the papers were thrown into water, left therein for eight minutes, and then washed and developed; *in all, the parts moistened with nitrate of silver acquired colour more rapidly and intensely than the rest.*

In order to ascertain which of the papers had its photographic properties most heightened by solution of nitrate of silver, these papers, after being moistened with nitrate of silver, were simultaneously brought into the light, exposed for equal periods ($\frac{1}{2}$ to 2 minutes), washed, and simultaneously developed. The colouration of the spots moistened with nitrate of silver in the clear sunlight agreed with that already observed. The most intense colouration was that of the bromide, the weakest [among the haloid salts], that of the chloride; the colouration of the clean paper with nitrate of silver was still weaker. In the developer, however, the iodide acquired the deepest colour, and became greyish black; the colour of the bromide was rather less deep (only blackish brown); that of the chloride was still weaker, and that of the clean paper weakest of all. Hence, when in contact with nitrate of silver, iodide of silver is most strongly affected, next to this the bromide, and least of all the chloride. These bodies therefore behave, when in contact with nitrate of silver, exactly as in the pure state.

From the greater sensitivity of iodide of silver in the presence of nitrate of silver, it has been inferred that pure iodide of silver is quite indifferent to light, and is indebted for its sensitivity to a trace of nitrate, which cannot be got rid of even by long washing. Sutton (*Photogr. Archiv.*, 1862, p. 188) especially has warmly defended this view. He starts from the fact, that iodide of silver precipitated from an excess of solution of iodide of potassium is indifferent to light. He thinks it improbable that a trace of retained iodide of potassium can be the cause of this indifference, and that he must, therefore, assume that iodide of silver is not in itself decomposable in the light, but only favours very energetically the decomposition of other decomposable silver salts which may be in contact with it. He consequently attributes to the iodide of silver only the office of a mere substance of contact (*Contactsubstanz*; catalytic substance).

To explain the sensitiveness of washed iodide of silver, he assumes it to retain a trace of nitrate of silver, which alone is sensitive to light, and the sensitivity of which is only assisted by the presence of the iodide of silver. His argument here is inconsequential. He resists the assumption, that a trace of iodide of potassium, mixed with the iodide of silver, can have any action, and then ascribes an essential action to the trace of nitrate, which is supposed to remain in the iodide. But he goes still further. In order to explain the sensitivity of daguerreotype plates, in the preparation of which only metallic silver and vapours of iodine or bromine and iodine are employed, he assumes that in the cleaning of these a trace of oxide of silver is produced on the surface, and that this forms the true sensitive body. This rather bold assertion is supported by no experimental proof, and therefore I do not consider it necessary to contradict it. In the same way he explains the greater sensitivity often ascribed to a mixture of iodide and bromide of silver from the action of contact, which is exerted by iodide of silver upon all the salts of silver which are decomposable by light, and even says that in their decomposition metallic silver is set free. That the last supposition is erroneous I have already proved. I cannot see why he should assume that metallic silver is set free during the process of insulation. He does not say that it is necessary for the production of the picture, as has been positively asserted by Davanne. Schnauss and Monckhoven (*Photogr. Archiv.* 1862, p. 188,) also regard the presence of a trace of free nitrate as necessary. I did not think it improbable that iodide of silver actually retains a trace of silver; and I have already positively demonstrated that the paper which bears the iodide retains some nitrate of silver. I therefore at first believed that this trace of nitrate might have some essential action.

When iodide of silver is exposed to light in contact with nitrate of silver, silver is set free. These silver particles thus set free attract, as I suppose, silver from the developer, and thus cause the appearance of the picture. The favourable action of the excess of nitrate present would, therefore, be easily explained from the increased separation of silver caused by it; the preventive action of acids by the retardation of the reduction; and the destruction by acids of the photographic properties of insulated iodide of silver by the solution of the silver particles reduced by the action of light. In short, the whole cycle of phenomena here described would be easy of explanation from the point of view just indicated. Nevertheless, this point of view is not tenable, inasmuch as it is in contradiction to the following facts:—

1. It does not explain the acquisition of a pale yellow colour by iodide of silver, which has become grey by exposure, and the concurrent destruction of sensitivity produced by iodide of potassium; for metallic silver, even when finely divided, is not affected by iodide of potassium.

2. The bleaching action exerted by nitric acid upon insulated bromide and iodide of silver, and the concurrent destruction of their photographic action, cannot be due to a solution of particles of metallic silver adhering to the iodide; for the nitric acid does not afterwards give a reaction of silver.

3. The following experiment proves most convincingly, that the presence of nitrate of silver in the iodide is not the cause of the sensitiveness of the latter.

I cut two strips of iodide-of-silver paper, and laid them in the dark in a solution containing five per cent. of common salt; they remained in this for an hour. The colour of the papers was not in the least changed. They were then washed and left lying in water, and finally exposed and developed simultaneously with a moist iodide-of-silver paper, which had not been treated with solution of chloride of sodium. If even a trace of nitrate of silver had been present in the iodide of silver, this must evidently have been destroyed by the action of the chloride of sodium, and converted into chloride of silver; and if the presence of nitrate of silver be the essential cause of the sensitivity of the iodide, this must have been either weak or entirely wanting in the papers treated with chloride of sodium. With the developer, however, both papers were blackened with equal rapidity, and the paper treated with chloride of sodium even a little more intensely than the other. This experiment, repeated several times with the same results, sufficiently proves that a trace of nitrate in iodide of silver is not the cause of its sensitiveness.

(To be continued.)

HOW TO PREPARE TRANSPARENT POSITIVES FOR THE MAGIC LANTERN.

Being Short Lesson in Photography, No. 25.*

The glass picture for a magic lantern is two inches and a half square, and consists generally of one of the photographs of a transparent stereograph. Thin plate glass is most suitable for the purpose. We will suppose, as a first example, that a statue is to be the object whose picture is to be exhibited.

A negative is first taken. It is immaterial by which process the negative may be effected, whether wet or dry, the object being to obtain the best result. Above all things, all flaws must be avoided, such as apertures in the film, or black specks on any part; for these, although exceedingly small, are magnified when exhibited in very distinguishable defects. The negative, too, must be quite clear, free from every trace of fogging, and very bright and sharp, and in like manner, devoid of all distortion from spherical aberration. To accomplish all these ends, the bath and collodion must be in the very best conditions possible.

More transparency is required here than for ordinary printing; hence, if it should happen that the transparent parts are in some degree clouded, clear off the fog, by means of a dilute tincture of iodine, or of iodine dissolved in iodide of potassium; either of these solutions converts the foggy silver film into iodide of silver, which, after washing, is dissolved off by either hyposulphite of soda or cyanide of potassium.

If the dark parts, after this operation of clarifying, are not sufficiently opaque or dense, they may be rendered more so by again using one of the solutions of iodine, until the shades of the negative have assumed a uniform greyish cream colour. The plate is then washed and flowed with the ordinary pyrogallic acid intensifier containing a few drops of silver solution. Any degree of intensity may thus be obtained. The negative is then washed and dried.

From the negative we prepare positives either by the wet or dry process.

By the Wet Collodion Process.

Have constructed a box of light wood in which the camera can slide, and of sufficient length for the purpose. At the end, and in the middle of this end, an aperture is cut for the reception of the negative, which lies on a narrow groove, and is held in its place by pins or tacks at the corners. The negative is placed in its groove, wrong side up, and with the collodion film towards the light. Take especial care that the box is made quite rectangular. Knowing the focal length of the lens, the camera can be drawn out to the proper distance accordingly. Thus, if the copying lens have a focal length of three inches, the distance between the negative and the centre of the lens, as also between the ground glass and the said centre, will be six inches. Turn the end of the box to a white cloud, and, so adjusted in a rough way, focus with the utmost accuracy by means of a magnifying lens, and fix the camera firmly to the box. Proceed now in every respect as you would if you had to take a negative. The result, however, will be a positive by a transmitted light, because the lights and shades are now reversed. Besides this, the positive will be direct, and not like an ambrotype where right is left and vice versa.

When the negative was taken, the statue previously demanded great artistic skill in the posing. A side light is the best for the principal light; the secondary light is obtained by a screen placed so as to reflect light coming in from above. The shades must be gradual backwards; and the background may consist of a black screen placed three or four feet behind the statue. Much of the success of relief at the exhibition depends upon the proper gradation of shades in the negative. When these shades are soft, and gradual from the anterior parts to the background, which must be quite black, the simulation of relief is exceedingly deceptive.

The positive has to be clarified in the same manner as the negative, where it is required; and also to be intensified in the same way. The background, if not intensely black, must be made so by means of a mixture of lampblack and asphaltum laid on with a camel's-hair pencil. This pigment must be laid on with great caution, so as not to injure any of the outlines of the model. When dry, the positive is mounted upon a piece of thin plate glass of the same size, the picture being between the two plates. So mounted, it is not necessary to varnish the film. When exhibited, the picture is inverted, and the plate which holds the positive is next the lens and the screen.

By the Dry Process.

Copying by contact is a very simple operation, which requires, however, the same degree or amount of normal conditions of the materials as the wet process. The handsomest results for the exhibition are produced by the albumen process. Any of the dry plates, however, may be used. The negative for such operations must be varnished: it is then placed in the printing frame, as is usual when printing paper pictures. Over it is placed a dry plate, as, for instance, of tannin, the two films being in contact. The frame is then closed, in the dark room of course, and placed upon a board of wood, so that light cannot reach the picture.

An exposure of half a second, or even less, to daylight will be enough; or the exposure may be made in the diffused light of the room, when two or three seconds will be sufficient.

It is equally easy also to print by means of gas light, or the light from a well-trimmed kerosene lamp, or from a piece of burning phosphorus.

The reader is supposed to be acquainted with the mode of developing a dry plate. A tannin plate admits of clarification with the same facility as an ordinary collodion picture; and this clarification can seldom be dispensed with for the purpose in question. It is true, the time of exposure and

* Condensed from *Humphrey's Journal.*

the development can be so regulated as to produce a very bright picture at once; but beginners do not always succeed; in which case it is well to be furnished with means by which imperfect results may be ameliorated.

In every case see that the objects exhibited, such as statues, basso-relievos, &c., are perfectly isolated from all other lighted objects by means of asphaltum, &c. This is a material point. Landscapes, architectural productions, groups, cities, and shipping are neatly isolated in like manner in the form of ovals, &c., so that no light illuminates any other part of the screen but that which forms the picture.

PHOTOGRAPHY INDOORS.

BY REV. H. J. MORTON, D.D.*

If photography in the fields is full of variety and pleasant excitement, photography indoors is by no means devoid of interest. The photographer in his "rooms" is a privileged person. All the beauty, grace, and intellect of the land passes in review before him. His opportunities, too of studying character are endless; may we hope that they are edifying and calculated to elevate his ideas of humanity? We sometimes fear not. "In vino veritas," the proverb says: we think there is a good deal of "veritas" in collodion and other chemicals. Wine brings out the hidden weaknesses of humanity, and the chemicals of the operator do the same work. Let us look for an instant at this. Here is the brave naval commander, bronzed by a thousand storms, bearded and whiskered, bearing on his stern face the impress of many battles with the belligegerent ocean, whose wave-shocks he has manfully met and victoriously resisted, and of the fierce "yard-arm to yard-arm" conflict in which he has gallantly led his boarders, or cheered his fainting gunners. One would say, the roar of cannon and the clash of cutlasses must have shaken out of his soul all small vanities and fastidious concern about personal appearances. But it is not so. Our chemicals soon reveal the fact that the brave warrior is as curious about his naval coat, and the cast of his countenance, as the citizen who has never seen a storm, save out of his parlour windows, nor encountered any foe more formidable than an extortionate cabman or surly night guardian. The profound statesman is as profoundly interested in having his face and form favourably represented, as of having his political acumen duly appreciated by his nation and constituents. The chemicals reveal personal vanity as distinctly in the gravest judge as in the gayest votary of fashion, and discover to our astonished mind that the ermine and the cassock, and the panoply of war, cover the same elements of character as the crinoline and the camel's hair. If the operator has a large patronage, and has to keep many people waiting, he soon finds his acids and alkalies developing impatience, where there seemed to be nothing but profound philosophy and entire superiority to all sublunary interests, and bringing hasty words and unreasonable tempers out of the most placid and imperturbable exteriors. But there is a pleasant as well as a painful series of discoveries due to the same agency, and many a morose-looking sitter is "developed" into a long-suffering and most amiable subject. The observant operator ought, therefore, soon to become a shrewd judge of men and manners, satisfied that men and things are not always what they seem to be.

It is a serious question with us, whether photographers are not liable to damages under the law of libel! If in any public print they set us before the world ridiculously and falsely, we can commence a suit against them. Why not, if they do the same by means of photographic pictures? Nature has given you an easy natural air, an intelligent countenance, a respectable ladylike, or gentlemanly, carriage. The photographer twists your head, and distorts your limbs, and sets you before the world an awkward and constrained creature, and, by the demand for a long-continued steady stare at an object devoid of all interest, contrives to empty your face of all expression, but that which belongs to an imbecile. Is he not liable for damages in consequence of such conduct? The question has not as yet been tested before a jury, but we doubt whether an intelligent body of twelve men would not decide the matter in favour of the sitter, particularly if well charged by a judge whose own dignity has been outraged by a like process of misrepresentation. The sitter, it is true, is often *particeps criminis*. Some people will insist on absurd attitudes and unnatural expressions of countenance. But, generally, the portrait depends for its propriety on the operator who regulates the details of posture and effect; and this leads us to remark that the photographer, for his own sake, and for the sake of his sitters, and for the credit of his profession, ought to be an *artist*. To consider photography a mere mechanical affair is a great mistake. All the qualities of a good painter ought to belong to a good photographer, and they *must* belong to him, if he is to attain to true eminence. He has done a small part of his work, if he has simply attained the art of producing clear and well-toned impressions. Every face and form have their best and worst aspects. A man may be made to look unlike himself, though every feature is accurately rendered. It needs talent to detect, and judgment to select the best lights and the best positions. Grace may often be discovered amid great awkwardness, and though nature cannot be *altered* by the artist, it may be aided and well arranged by him. A boundless field of opportunities, too, is opened by *accessories*. We are often struck with the utter want of invention exhibited by some operators. The continual curtain and the everlasting column weary and fill one with wonder as we turn over the leaves of an album, and we are constantly led to ask, "Is it absolutely necessary that every member of a family should lean on the same pedestal, or stand staring over the same balustrade?" Some photographic portraits are real pictures. Why should not all, or nearly all, be the same? A true knowledge of art would diversify our portraits, and present us with a succession of fine effects and pleasing pictures. The photographer stands in as much need of a good supply of accessories, as the player of a sufficient wardrobe, or appropriate "properties." If it would astound us to see Cæsar, Yengeskhan, Hamlet, and Richelieu, one and all, in bag wigs or Roman togas, why should we be less amazed at beholding great generals, judges, divines, and state diguitaries each seated in the same carved-back chairs, leaning on the same covered tables, and holding the same well-worn edition of Mrs. Hemens' poems, or the faded annuals of former generations! Some noble portraits of artists in their studios, of philosophers among their polished apparatus, or figures amid Rembrandt shadows and beautiful natural or artificial forms, have made us weary of the continual sameness and miserable poverty of most photographic likenesses. Better the head as a vignette, with nothing beside, than the face and form with the monotonous repetition of posture and surroundings too commonly selected. Photography is a glorious art. It ought to be elevated far above a mere mechanical adroitness. We have listened to some admirable lectures addressed to its profession by chemists and opticians. Why should not these be supplemented by equally able and eloquent expositions by painters and poets? We often occupy ourselves in fancying what Raphael, Michael Angelo, or Sir Thomas Lawrence would have done with photography, had the thing been the discovery of their day, and we can hardly fail to think that they would have established a school for the instruction of photographers in the principles of art, as well as of science. They would have had the intended operators taught the rules of perspective and colouring, of light and shade, of grouping and drawing; and, as a result, we should have had photographic portraits that would have lived by the side of the best effects of Rembrandt and Rubens; landscapes, recalling Claude and Salvator, instead of a dismal

* *Philadelphia Photographer.*

series of dreary repetitions, which recall nothing but the wonders of Jarley's wax-work show, or the dress patterns in a book of fashions. Is it not possible, even now, to remedy the evil, and raise this art to the noble position which it ought to occupy?

Proceedings of Societies.

Amateur Photographic Association.

award of prizes.

A council meeting was held August 12th, at 12, York Place, Portman Square, Major Russell in the chair.

The minutes of the last meeting having been read and confirmed, Mr. Glaisher read the report of the referees respecting the relative excellence of the pictures, of which the following is an abstract.

There were forty-eight pictures of the highest class (prizes not included) contributed as follows:—J. W. Rimington, Esq., 10; Dr. Hemphill, 6; Col. Holder, 5; W. D. Chidson, Esq., 5; Captain Bankart, 5; The Hon. W. W. Vernon, 3; F. Beasley, Esq., 3; Major Gresley, 2; Captain Hutton, 2; H. Wood, Esq., 2; B. Jones, Esq., 2; G. Bevington, Esq., 1; F. E. Currey, Esq., 1; F. H. Lloyd, Esq., and W. D. Howard, Esq., 1; G. S. Penny, Esq., 1; Captain W. H. Mason, 1.

In class 2 there were 109 pictures, contributed as follows:—J. W. Rimington, Esq., 20; Sir J. J. Coghill, 7; the Hon. W. W. Vernon, 5; Lt.-Col. A. Holder, 5; Captain Bankart, 5; J. A. Melany, Esq., 5; C. A. Baylay, Esq., 4; A. Suzanne, Esq., 4; Captain Bonamy, 4; Captain W. H. Mason, 4; Dr. Hemphill, 3; Rev. F. Gutteres, 3; J. C. Arkwright, Esq., 3; Major Gresley, 3; Captain Hutton, 3; G. Bevington, Esq., 3; F. E. Currey, Esq., 3; Sir M. Cave, 2; J. S. K. Moss, Esq., 2; F. Beasley, Esq., 2; Lieut.-Col. the Hon. D. F. de Ros, 2; H. St. Vincent Ames, Esq., 2; J. A. Rolls, Esq., 2; F. N. Lloyd, Esq., and W. D. Howard, Esq., 2; W. D. Chidson, Esq., 2; the Countess of Rosse, 1; J. A. C. Branfill, Esq., 1; J. A. Silk, Esq., 1; G. S. Penny, Esq., 1; B. Jones, Esq., 1; the Hon. R. Abercrombie, 1; Rev. W. S. Meade, 1; Miss Louisa Ramsden, 1; R. Staples, Esq., 1; Hon. and Rev. A. Campbell, 1.

In class 3 there were 132 pictures, contributed as follows:—J. W. Rimington, 35; Hon. W. W. Vernon, 9; Captain Bankart, 9; Rev. F. E. Gutteres, 7; J. A. Melany, Esq., 5; F. H. Lloyd, Esq., and W. D. Howard, Esq., 6; G. Bevington, Esq., 4; G. S. Penny, Esq., 4; F. Beasley, Esq., 4; J. Rivington, Esq., 4; Major Gresley, 3; Hon. R. Abercrombie, 3; H. St. Vincent Ames, Esq., 3; Lieut.-Col. the Hon. D. F. de Ros, 3; Lieut.-Col. Holder, 3; J. A. C. Branfill, Esq., 3; Sir J. J. Coghill, 2; St. John Coventry, Esq., 2; A. Suzanne, Esq., 2; C. A. Baylay, Esq., 2; B. Jones, Esq., 2; Dr. Hemphill, 2; Captain W. H. Mason, 2; F. E. Currey, Esq., 2; H. Wood, Esq., 2; Sir T. M. Wilson, 2; J. A. Silk, Esq., 1; Rev. T. Hervey, 1; Sir M. Cave, 1; J. S. K. Moss, Esq., 1; S. Mortimer, Esq., 1; Miss L. Ramsden, 1; J. C. Arkwright, Esq., 1.

Class 4 comprises a very large number of excellent pictures, in which, as contributors, may be noticed the Rev. G. Egerton; Mrs. S. Harris; the Rev. J. Williams; F. H. Glossop, Esq., and others.

Scarcely so many stereoscopic pictures have been contributed this year as last, but the improvement in quality is very considerable. First among the contributors of stereo pictures is C. A. D. Halford, Esq., his instantaneous pictures and interiors are exceedingly fine; next to him ranks Captain Mason, who has sent some very interesting Indian subjects; some very good stereos have been exhibited by the following members: E. J. Lane, Esq.; N. K. Cherrill, Esq.; Dr. Maidstone Smith; R. B. Bowman, Esq.; Rev. E. Gutteres; Walter Jeffreys, Esq.; W. H. Cock, Esq.; D. Laurie, Esq.; Arthur Booty, Esq.; G. W. Keeling, Esq., and T. Turpin, Esq. In addition to these, an interesting series of micro-photographs has been sent by Drs. Wilson and Abercrombie.

The following prizes were awarded:—

Dr. M. D. Hemphill, "Drawing Room at Newtown Anner;" J. W. Rimington, Esq., "Study of Ferns and Ivy;" Captain Hutton, "Caryatides, Athens;" G. Bevington, Esq., a pair of pictures, "A Calm and a Storm;" E. R. Hall, Esq., "Series of Views at Oxford:" F. H. Lloyd, Esq., and W. D. Howard, Esq., "Lac de Gaube;" Captain Mason, "Mahomedan Tombs at Hookeree."

Stereo Prizes.—1st to C. A. D. Halford, Esq., "The Beach and Pier, Ventnor" (instantaneous); 2nd to C. A. D. Halford, "Interior Drawing Room at Dytchley, the seat of Viscount Dillon."

Certificates of honourable mention were awarded to the following members:—J. W. Rimington, Esq.; the Hon. W. W. Veruon; Lieut.-Col. Holder; Captain Bankart; Dr. Hemphill; Major Gresley; Captain Mason; Captain Hutton; W. D. Chidson, Esq.; C. A. D. Halford, Esq.; F. Beasley, Esq.; Sir J. J. Coghill; J. A. Melany, Esq.; A. Suzanne, Esq., the Rev. F. E. Gutteres; F. H. Lloyd, Esq., and W. D. Howard, Esq.; G. Bevington, Esq.; F. E. Currey. The council would gladly have awarded prizes to several other members had the funds permitted; amongst them may be mentioned, as particularly deserving, the Hon. W. W. Vernon; Captain Bankart; Major Gresley and Lieut.-Col. Holder; W. D. Chidson, Esq.; and F. Beasley, Esq.

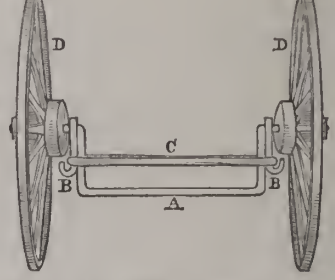
The Secretary was directed to mention in the report that the delay in awarding the prizes this year has been owing to the great difficulty the council have experienced in arriving at a just and satisfactory decision, in consequence of the large number of first-class pictures from which the prizes had to be selected, the present meeting being the third which had been convened for that purpose. A. J. Melhuish, Hon. Sec.

Correspondence.

PHOTOGRAPHY ON WHEELS.

Sir,—Your correspondent "Somerset" has done good service by suggesting a ready means of saving labour, but he will permit me, I hope, to remark, that he has made a great mistake in using only one wheel, and that in front of the load, so that a considerable part of the weight must be *carried* by the operator or his boy.

Five years ago I procured a couple of light but well made wheels, 18 inches in diameter, the axle of which is a piece of half-inch round iron rod. These have accompanied me in several journeys, packed in a blue bag, and I have found them most useful. Last year I made an improvement on the original idea, by cranking the axle to the depth of five inches, and adding one or two very strong india-rubber rings, after this fashion:—



A is the cranked axle; BB a pair of iron hooks, fitted tightly on the axle, close behind each wheel, and hanging from it; C one, two or more (according two your weight), strong india-rubber rings, stretched very tight across the crank, and resting on the hooks; DD the wheels.

The span of my crank is 10 inches only. (And here let me say that the "narrow gauge" will be found to save a good deal of lifting and carrying.) A deal box, having a pair of vertical guides, on each side, for the crank to play between, is placed on the wheels, its whole weight resting on the india-rubber springs. In this box were packed the nitrate bath, developing and fixing solutions, collodion, and sometimes a small camera, with every kind of necessary apparatus. It should be made rather long and not too high. On the top of this is placed a Smartt's tent, and the camera legs, secured by two stout leather straps passing round the box and the things resting on it. A mackintosh cistern holding a gallon of water, suspended from the camera legs, completes the equipment.

The weight should be so adjusted as to be greatest in front of the axle; then, as you walk behind, resting a hand lightly upon the load, you have *literally* less than nothing to *carry*, and the whole thing weighing, perhaps, 100 lbs., is pushed forward with great ease. If you come to broken ground, the carriage separates in a moment into three or four portable packages.

The wheels, and axle, and store-box were contrived and made for me by Mr. Francis, of Great Russell Street, a man well known to many of your readers for his ingenious contrivances. I have used them in various parts of England, and on the Continent; and for those who adhere to the wet process, no arrangement can possibly be better. This year I am taking out a Rouch's tent, instead of Smartt's, but on my old wheels, and with essentially the same arangement.—I remain, Sir, your obedient servant, A London Amateur.

SUGAR IN DEVELOPMENT.

Sir,—Will you, or some of your talented contributors, tell me what action has a solution "of sugar of milk?"

In your Almanac you quote M. Kaiser's practice in developing, viz.: "A concentrated solution of sugar of milk, with a few drops of a concentrated solution of sulphate of iron." A correspondent in your last week's edition urges experimenters to try to secure sufficient force in the first development. This, no doubt, is the thing wanted. I have been for some time trying in this direction, and though I have to a certain extent succeeded, my experiments are vague and uncertain, for want of better chemical knowledge. It strikes me, that the sugar of milk solution, or some analogous mixture, is in the right direction, because it appears to act mechanically by giving body to the iron, and retaining the free nitrate on the plate in its exact position, and prevents it being swept along with the iron solution, when the latter is in its limpid state without any thickening. But I want to know whether it acts chemically as well, and, if so, in what direction? Hardwich makes no sign, and I cannot find in the index to your vol. for 1863 any reference to it. Kindly assist me. H. O.

[The fact that a solution of saccharo-sulphate of iron gives greater intensity than a solution of the simple sulphate, and that less acid is required when the former is used, has often been verified. The character of the deposit with the saccharo-sulphate appears to partake more of an organic character, and is generally of a browner and more non-actiuic colour, resembling somewhat, in point of fact, the deposit produced by a pyrogallic acid developer. Why less acid is required is more difficult to explain, as also the precise action of the sugar. It often happens in photography, that facts have to be ascertained and verified first, and the theory upon which they are based discovered afterwards. The point of first importance is to verify the facts. This must be done by experiment.—Ed.]

Photographic Notes and Queries.

The Patent Blinds.

Sir,—Referring to the recent discussion on the subject of Mr. McLachlau's patent, two questions have occurred to me upon which I shall be glad to have your opinion.

1. If I go to a manufacturer of Venetian blinds, and ask him to make for me a set of blinds to fit the windows of my glass room, as to form and arrangement in all respects exactly the same as he usually makes for the windows of dwelling houses, but with the strips or laths just four times as broad, and four times as far apart as those for common windows, shall I by using such be infringing Mr. McLachlan's patent?

2. If, instead of doing this, I go to a manufacturer of blinds and ask him to make for my glass room a set of the blinds now very commonly used for protecting shop windows from the sun, consisting of a series of frames covered with canvas projecting about half a yard from the window, and placed from half a yard to a yard apart, capable of being adjusted to any angle which may most conveniently exclude the sun's rays, without excluding light or covering the goods in the windows from the attention of passers by, shall I in such case be infringing Mr. McLachlan's patent?

I think an answer to these questions will bear very immediately on the discussion now exciting attention, and guide me in dealing with A South Light.

[In accordance with the dictates of common sense it would appear perfectly safe to say that in neither case would you be infringing Mr. McLachlan's patent, and we should have no hesitation in making use of such blinds as you describe. But, on the other hand, your Venetian blinds magnified four times, would give strips of about 9 or 10 inches broad, and the same number of inches apart, and thus appear to be almost identical with those described in Mr. Mc Lachlan's specification, and how the law would decide, we cannot say. The law is stated by a good authority to be the perfection of reason; but it is administered by mere mortals who are very often far enough from being perfect. Don't risk litigation, for the probability is that if you gain your cause you lose money.—Ed.]

Talk in the Studio.

Royal Cornwall Polytechnic Society.—Our readers will observe from an advertisement in another column that the thirty-second annual exhibition of this Society will open on the 7th of September next, and that photographers are especially interested therein. The society offer prizes of a first silver medal for the best, and silver and bronze medals at the discretion of the judges for other forms or degrees of merit in photographs. All details may be learned by communicating with the secretary at Falmouth. We commend the competition to the attention of our readers.

National Records and Photozincography.—It has been determined by the Government to reproduce a series of records and state papers relating to the history of Scotland, the *fac similes* to be executed at the Ordnance Survey Office at Southampton, by photozincography, under the superintendence of Col. Sir H. James.

The Copyright Act of Engravings.—An action was recently brought in the Westminster County Court, by Mr. McLean, against a shopkeeper in High Holborn, named Hall, to recover compensation for an infringement of the Copyright Act of Engravings, by selling a print of the "Prisoner's Widow." The damages were laid at £10. The plaintiff stated that he had paid £700 for the engraving of the plate of that picture, and £150 to the artist for the copyright, making £850. The print had since been photographed, and the piratical traffic had been carried on to such an extent as to do incalculable injury to the publishers, who spent such large sums of money. The judge considered that the defendant had rendered himself liable under the Act, and accordingly made an order for the amount of damages claimed and costs amounting altogether to about £50.

The late Exhibition.—The *Reader*, in a recent article on the exhibition, complains of its unrepresentative character. It says:—"The present exhibition is the only place wherein we find no traces of what is doing abroad—no examples showing the value of the process in reproducing rare and original works—no good specimens of its application to Government purposes, the only contribution from the Government photographer being a single plate illustrating the effects of shot and shell upon iron armour-plates. Where are we to look for the productions of the fine lenses of Venice, of Rome, and of Switzerland? How are we to know what has been done lately in the way of copying drawings and manuscripts? What is being done by photographers in Virginia on the battle-fields?—what in India, China, at the Cape, in Algeria? The tenth exhibition of the Photographic Society tells us nothing of any of these matters. The council have provided several frames of *cartes de visite*, some hideous enlargements from these, some small equestrian portraits, and such ordinary landscape-studies as we have seen for many years past; add to these a very imperfect collection of Indian photographs by Mr. D. H. Macfarlane, some ordinary English reproductions of foreign places, and some specimens of photolithography by Mr. W. Teevey, and we have brought together a collection forming the poorest exhibition the Society has yet set forth.

To Correspondents.

LEX.—There is no legal necessity to append the word "registered" or "copyright" to registered pictures; but in some cases it is desirable. The absence of any such intimation is, however, no justification of piracy. 2. We do not recommend the use over and over again of the same toning bath. It may be done without disadvantage in careful hands, but there are so many causes which may, under such circumstances, readily effect the decomposition of the bath, that we recommend the use of a small quantity at a time, somewhat weak, and throwing it away when it is exhausted.

J. C. S.—Pinholes may proceed from such a number of causes that we fear the mere general statement that you are troubled with them will not help us to form an idea of the specific cause. We have written several articles on the subject recently, in which we have endeavoured to point out some of the prevalent causes. Read those articles and let us know if they meet your case.

A. A.—It is possible that your sample of gelatine is at fault; but the presence of alcohol has sometimes the effect of causing the solution to run in the uneven way you describe, and its use is better avoided. The red deposit you describe is fog. It may proceed from various causes; the collodion may be unsuitable, or the bath may not be in good condition, &c. &c. Try a plate with the same materials by the wet process, and see if the fog occur then. Considerable over-exposure will sometimes produce a similar result, especially if the plates have been long kept.

No. 35.—Alcohol is the solvent of the Schnee varnish; but it is very difficult to remove a spirit varnish from a plate so perfectly as to permit the use of aqueous solutions upon it for intensification, &c. The best method of dealing with such plates is to moisten the film with alcohol, and then intensify with alcoholic solutions, as described in our YEAR-BOOK, page 41.

J. J. F.—It seems almost impossible to increase the sensitiveness of dry plates without, in some degree, increasing the risks of failure. Mr. Sutton's book on the dry process is a most valuable one, and the negatives we have seen produced by the author by the rapid process described are as perfect as possible, full of gradation, clean, brilliant, and of a rich warm tone, leaving, in short, nothing to be desired. The sight of a negative is the very best guarantee one can obtain as to the worth of a process.

W. W.—We scarcely understand the nature of your trouble, described as giving the appearance of the plate having been splashed with dilute whitewash. How large are the splashes? Are they in minute spots, have they tails, or are they in irregular patches? The hasty pushing down of the shutter of the dark slide will sometimes splash the plate with the drainings from the plate, and these, when developed, often look like white splashes. Sometimes the plate partially drying in places causes white patches like frosted silver when the developer is applied. Sometimes irregularities in the surface of the glass plate will cause the reduction of silver to take place abnormally, producing white spots.

FAILURE.—Your acetate of soda has a slightly alkaline reaction, and you use a very large excess of it. The proper proportion is after the ratio of thirty grains of acetate of soda to each grain of chloride of gold. The purple tint you describe is due to reduced gold in a very fine state of comminution, caused by adding excess of a salt with a slightly alkaline reaction.

F. VINCENT.—You may paint upon your distemper coloured background with oil colour. In order to get it to dry flat or dead, use the least possible quantity of oil, using turpentine instead.

T. C. B.—We know of no reason, *à priori*, to induce us to think that the hands will be injuriously affected by using an acetate toning bath; but sometimes curious effects are produced on certain constitutions. The hands ought really to come into but little contact with the bath, and they need not do so at all if horn forceps be used for handling the prints.

C. T. N.—The object of washing off the tannin solution is to gain an increase of sensitiveness. We are uncertain as to whether it will impair the keeping qualities of the plates, but we should think that it probably would do so. 2. We see no reason to hope for greater immunity from stains as a consequence of washing off the tannin solution.

VINCENT.—The question as to which is the best kind of gelatine for the carbon process, and where it can be procured, are quite undetermined at present, and can only be learnt by experiment. It is probable that when the subject is better understood, and the proper kind of gelatine absolutely determined, that photographic dealers will keep it in stock. But at present much uncertainty exists. French gelatine in sheets something like glue, but thinner and lighter coloured, seems to answer very well. Your film is much too thin, and may account for the difficulty of removing the paper on which it is coated, in order to develope. The question as to whether dextrine or some similar substance should be applied to the paper first is not certainly settled. It may be necessary with some samples and not with others. The object of using ox-gall is to make certain of the gelatine film readily leaving the glass, which it does not do at all times without such an application. See Mr. Blair's modification in the present number. Mr. Swan's specification will be out shortly, and then we shall probably learn something more on the subject.

ST. JOHN.—The want of sharpness in the lower portion of the figure, is doubtless due to some imperfection or unsuitableness in the lens. A lens of short focus and round field will not give the feet of a standing figure in focus, unless used with a very small stop. 2. The image dissolving when varnished, arises generally from a combination of faults. The same collodion might not dissolve with another varnish, and the same varnish might not dissolve another collodion. The spirit in the varnish is probably strong, and the pyroxyline of which the collodion is made, is probably of that quality which is dissolved in strong alcohol. You may avoid the result with the same collodion, by using a benzole or chloroform varnish, or by coating the negative previous to varnishing with dilute albumen or gum water, and allowing this to dry. 3. The cause of the moisture condensing on the back of your coated plate, is the sudden cooling of the plate by the rapid evaporation of ether. Rapid evaporation always causes coldness, and the coldness of the plate makes it condense the vapour which is in the atmosphere. 4. Filter varnish if necessary through a tuft of cotton wool pushed into the shank of the funnel. Before putting the varnish in, run a little alcohol through the cotton, and see that it runs freely. Applying the lips to the bottom of the funnel to draw the air through, will make the alcohol run readily through at once, and then the varnish will pass readily. 5. Collodion is better cleared by decanting than filtering; but if you wish to filter, procure a proper collodion filterer. 6. You may use your whole-plate portrait lens for landscape work, if you stop it well down.

PHOTO.—We are obliged by your interesting communication.

MEZZOTINT.—For large pictures, we still think that the resinized paper is much more effective and artistic in result than the albumenized paper. The difficulty to which you refer in preparing the paper so as to keep its colour, seems to have been overcome. We have a sample prepared by Mr. Cooper's formula by Francis & Co. of Islington, which is perfect and free from any change in colour at the end of three months.

TYRO.—The fact of your lens giving head and feet sharp, whilst the middle of the body is quite out, shows that it has a curved field. There are two ways of meeting the difficulty: arranging the position of the figure to accommodate as much as possible the curve of the field, and using a smaller stop. To flatten the field, the stop is best placed in front of the front lens. Of course, this will lengthen the exposure, but all you can do in such a case is to effect a compromise. 2. You will find a method of ascertaining the focus of a lens described on page 89 of our YEAR-BOOK. Hermagis is a pretty good French maker. The words engraved on the tube "Opten. Fabant." are contractions of Opticien Fabricant, or manufacturing optician. The other letters "s.g.d.g." following "breveté," mean "sans garantie du gouvernement," meaning that the article is patented, but without the protection of government. We have no equivalent to this process in England; and so far as we understand the matter, it is a patent which is really no patent. 3. Nitrate of silver is made by dissolving pure silver in dilute nitric acid. You will find full instructions on pages 6 and 29 of our 5th volume. 4. In strengthening your gold bath, add both chloride of gold and chloride of lime in just the same proportions first employed.

FREDERIC BRETON.—Your photographs of microscopic subjects are very satisfactory, and amongst the very best we have seen. We shall be glad to receive a more detailed description of your proceedings for publication. The lowest power made, we believe, in microscopic objectives is 2-inch. If you require one of 3½ or 4-inch, you will have to get it made. It would then be probably somewhat costly, and having small angular aperture, would be slow. Would it not be better to try to adapt a portrait lens of the required power. There are lens of 3½ and of 4½ inches equivalent focus in existence. It is probable that with bromo-iodized collodion and iron development, you will experience less difficulty with the yellows and browns than you imagine.

SOUTH LIGHT.—You do not state the nature of your difficulty, nor what kind of defects occur in your positives. If you describe the character of the defect, we can probably explain the cause. The bath and developer you describe, should have the nitric acid omitted to make them suitable for negatives. 2. Stop out the direct sunlight by thin white blinds. See first article in the present number.

The "Amateur's Manual of Photography," by R. Kingham; and "Photographic Manipulation," by S. R. Divene, will be noticed in our next.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. A. ROBERTSON, 88, Glassford Street, Glasgow,
Three Photographs of Rev. George Jeffery, D.D.

MESSRS. WINTER AND SON, Beverley, Yorkshire,
Photograph of Edward Stanley Earle, son of George Earle, Esq., Beverley.

MR. JAMES BECKETT, Church Street, Preston, Lancashire,
Photograph of Rev. Brindle.

MESSRS. HELSBY AND CO., 34, Church Street, Liverpool,
Five Photographs of Miss Emma Gunniss.
One Photograph of Miss Sarah Gunniss.
One Photograph of Miss Ellen Gunniss.
One Photograph of Miss J. Gunniss.
One Photograph of Miss L. Gunniss.
One Photograph of Miss N. Nesbitt.
One Photograph of Miss Bufton.
Two Photographs of Mr. S Bancroft.
One Photograph of Mr. Thomas Thorne.
Four Photographs of Mr. Thomas Thorne as "Timothy to the Rescue"
One Photograph of Mr. Thomas Thorne and Miss Weston as Nicodemus Nobbs and Susan in "Turn Him Out."
One Photograph of Horse, "Shepherd F. Knapp," Winner of the Grand International Trotting Stakes, Liverpool, August 4th, 1864.

MR. J. H. KAY, 57, Argyle Street, Glasgow,
Two Photographs of Rev. Matthew Cochrane.

MR. WILLIAM KEIGHLEY BRIGGS, Beech Villa, Harrogate Wells,
Photograph of Lord Palmerston.

MR. A. S. WATSON, 2, Regent Road, Great Yarmouth,
Photograph of Col. Colvin.
Photograph of Rev. Hemsworth.
Photograph of Rev. Hurst.
Photograph of Sir Edm. Lacon, Bart.
Photograph of Bowyer, Esq.
Photograph of Thurtle, Esq.
Photograph of John Brown, Esq.
Photograph of Rev. Leithes.
Photograph of Rev. Dr. Pinnock.
Photograph of Captain Ormond Judian.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne,
Two Photographs of Rev. Canon Eyre.
Two Photographs of Hugh Taylor, Esq.
One Photograph, Group of the first Eight Presidents of Methodist Free Church.

All Communications for the Editor to be addressed to 32, PATERNOSTER ROW.

THE PHOTOGRAPHIC NEWS.

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THE HEALTH OF PHOTOGRAPHERS.

WE have more than once been asked by gentlemen interested in the study of disease, whether there was reason to believe that photographers suffered from any special class of ailments incident upon their occupation. Our answer has been, that we had no reason to believe that they suffered from special diseases; but they were, undoubtedly, to some degree subject to special dangers. Our attention is again called to the subject by an excellent article by Mr. Carey Lea, which will be found on another page, and to which we commend the attention of our readers.

Photographers, in common with others engaged in professional life, undoubtedly live fast—we do not use the word in its slang sense, but as expressive of the high pressure at which the system is kept. There is much exercise of the brain, as well as exhaustion of the body; but this is a state of things which, as we have said, they share in common with many others whose occupation involves something beyond digging and delving, or obtaining their bread by the sweat of their brow. Beyond this they are subject to the exhausting and enervating temperature of a glass house for many hours daily during summer weather, and they are engaged in the use of many substances which are antagonistic to human health. We believe, however, that by far the most dangerous action to which photographers are subject is that of cyanide of potassium. The alarm has been sounded over and over again, and most photographers are aware of its poisonous character, if taken into the system; but we have reason to believe, notwithstanding this, that many fail to take anything like proper precautions to avoid the chance of its entering the system, either by absorption through the skin, or by the deleterious element it contains (hydrocyanic acid) in breathing. We are not going to enter into any theoretical discussion on the subject here. We know that some high medical authorities have pooh-poohed the idea that any injurious results could follow the general use or contact of the skin with cyanide of potassium, and have referred to cases in which its constant use has not been followed by any injurious consequences. We also know many cases in which it has been innocuous; but we remember also the inexplicable influence of idiosyncracy, or individual peculiarity of constitution in such matters, and whilst we know of many cases in which cyanide of potassium has been used without any apparent influence, we also know of many in which its results have been most dangerous. We know of one case in which one of the ablest photographers in the world lost a finger through its use, and endured some weeks of indescribable torture. Another called upon us only a few weeks ago in a great state of debility, who stated that he had been ill for some months, with thorough prostration and injured eye-sight through "cyanide poisoning," by absorption through the skin. We were recently consulted by a young lady engaged in photography regarding a painful affection of the hands, all the fingers having inflammatory swellings resembling chilblains, in the midst of summer, which had followed the incautious use of cyanide for removing stains of nitrate of silver; and we can call to mind many other cases.

Even when it is not suffered to come into contact with the skin, it is by no means an innocuous agent to use. It is very easily decomposed, and, as may be readily detected by the smell, gives off more or less of the vapours of hydrocyanic acid, which are most injurious and dangerous in their action. Some time ago, having been attending the dying bed of a friend, a very able photographer, we entered into conversation with a physician of very high standing, who had made "Bright's disease," from which our friend was suffering, his especial study. It is sufficient to remark here that in this disease, which is incurable, the blood becomes charged, and eventually poisoned, with cyanate of ammonia, or urea, the kidneys failing to eliminate it from the system. The question arose how far the very constant habit of using cyanide of potassium, and purposely, with strange waywardness, breathing its fumes, might have contributed to the condition of the patient. Of course, no direct or explainable connection could be traced, but the possibility of some remote and unexplained action was readily admitted. The doctor conceived the subject to be of sufficient interest for further investigation, if data could be obtained, and intimated that if we had opportunity of collecting some statistics of the ailments and symptoms of photographers, he would willingly enter into the question of how far they were due to specific causes arising out of the practice of their profession. For a moment we contemplated asking for general information on the subject from our readers; but a second thought changed our resolve, on the ground that nothing is more injurious and calculated to produce morbid conditions in any person than a habit of watching his own symptoms. There are extreme cases on record, in which looking for symptoms has induced a disease, so powerful is the effect of the mind upon the body.

The object, then, of our remarks is twofold: first, carefully avoid the unnecessary use of poisonous or injurious agents, and in the pursuit of a profession which taxes the vital system, neglect no known means of preserving health, giving especial attention to the ventilation of the glass room, and above all of the dark room; but, next, avoid a morbid habit of watching symptoms, or allowing the mind to dwell upon the probable injury arising out of duties necessary to the prosecution of a pleasant and honourable profession.

THE FOTHERGILL PROCESS.

In reference to a brief resumé of the modification of the Fothergill process, as practised by Captain Bonamy, given in a recent number of the News, and the results of which we described as exceedingly fine,* we have received a few additional particulars from that gentleman, which may be interesting to our readers. He advocates, as a general rule, the removal by a wash of distilled water of the final traces of silver left by the 5-grain solution. He says:—

"It is sufficient just to cover the plate with distilled water, leave on for a few seconds, drain and dry. If more freely washed, the plate is of course less sensitive, but keeps longer, and the quality of the negative is, if anything, improved. If you think it may assist any of your readers who might be tempted to try the process, after the favourable remarks you have made on my work, I add a few notes to be used at your discretion. The final solution of nitrate of silver I generally prepare as follows:—Take, say 30 ounces, of distilled water, in which dissolve 150 grains of nitrate silver, neutralize with carbonate of soda, filter, and add half a drop of acetic acid to the ounce. In fact, prepare a weak nitrate bath, but *without* iodizing it. I use one ounce of this for each 11×9 plate. It may be diluted one-half, but I prefer the full strength, to make sure of converting the albumen and bromide in the film into the silver compounds.

The process will bear both a strong developer and a long development if necessary, without loss in brilliancy or delicacy of detail. I generally use 3 grains pyro, 1 grain citric acid, to the ounce, adding six to eight drops of a 20-grain solution of nitrate of silver to the ounce of developer to start with. More silver or acid, or both, being added to the second and third dose of developer, as circumstances may require to produce the best result, which depends much on the skilful development of the negative.

Subjects with strong contrasts of deep shadow and brilliant high lights I prefer developing with a 5-grain solution of pyro, omitting the acid and adding two or three drops only of the silver solution to start with, then intensifying the phantom image with an ordinary developer.

I mentioned five minutes as the exposure given to some of the photographs I had the pleasure of giving to you, but it may be as well to add that was under the most favourable circumstances—a bright actinic day and sea-side subject. Three or four times that exposure might be necessary with less favourable subject and light.—Yours, dear sir, very truly,

J. E. Bonamy.

Critical Notices.

PHOTOGRAPHIC MANIPULATION, or a System of Practice for the Chemical Department of the Portrait Gallery. By S. R. Divine. New York: Seely & Boltwood; and Liverpool: J. Atkinson.

The little volume before us is essentially a manual of practice, setting forth very clearly the details of photographic manipulations as practised in America. Its aim is not so comprehensive as that of Professor Towler's "Silver Sunbeam," nor does it, like that gentleman's *American Photographic Almanac*, possess the character of an universal photographic receipt book, but it is a very complete manual for the portraitist, and evidently the work of a practical man. We cannot quite endorse all the views propounded, and in one or two points we may name, such as attributing to the nitrate bath a more solvent power upon iodide of silver when hot than when cold, the book is not quite in accordance with the latest discoveries in photography, but in the main it is a useful and trustworthy book. From the following extracts on the negative nitrate bath, our readers will perceive that some American photographers use a much stronger solution than is generally used in this country.

THE NEGATIVE NITRATE BATH.

Take pure crystallized nitrate of silver and fuse it in an evaporating dish, taking care not to raise the heat much higher than the melting point. By this means there is a small portion of nitrate of silver formed, which has a powerful effect in giving vigour and intensity to the negative, and at the same time the silver is purified from organic matter if any happen to be present.

When cold, dissolve the fused nitrate in pure water, and dilute till the hydrometer indicates fifty-five grains of nitrate of silver to the ounce. This solution, when iodized and made slightly acid, is a proper negative bath. It may be used without iodizing if a thick collodion is used, and the plates are taken out just as soon as they are coated, *i.e.*, when the film is wet smoothly and does not appear greasy. The bath will shortly acquire a necessary amount of iodide of silver from the plates that are immersed in it. Nitrate of silver dissolves a portion of iodide of silver—the amount dissolved being in proportion to the strength of the solution—and if the plate remains for any length of time in a bath made without iodizing, the coating of iodide of silver will be entirely removed, and the plate be left worthless.

We would recommend the operator, however, to iodize the bath by separating it into two equal portions, iodizing one to saturation and filtering, and then mixing it with the other. The bath will then have lost its greed for iodide of silver in a great measure, without being saturated with it. Iodide of ammonium, or potassium, may be used to iodize the solution, adding enough to leave a very small portion of iodide of silver undissolved after thorough shaking. The quantity required will not exceed three or four grains to every ounce of nitrate of silver in the solution. Nearly all the works that have been written on photography give directions for iodizing a bath to saturation, *i.e.*, the full amount that it will take up. For negative baths, however, such a mode of preparation is totally wrong. A bath grows weaker from the time the first plate is immersed, and consequently loses its power of retaining so much iodide of silver in solution. If the bath is saturated at the outset, it will precipitate iodide of silver as it becomes weakened by use, which will lodge in fine particles on the collodion film and cause a multitude of *pinholes*, which will injure, or wholly spoil the negative. These pinholes will become apparent after coating a very few plates when the bath is fully iodized, and if a plate is examined before development, it will be seen to be covered with specs resembling fine sand. They stick obstinately to the film and prevent the reduction of silver on the spot where they rest during development, and hence leave a hole or clear spot by transmitted light. Pinholes caused by iodide of silver, precipitated from the bath, are exceedingly small and of a jagged shape, in consequence of the angular form of the crystals.

* * * * * * * *

We have described the way in which a bath becomes unfit for use by causing pinholes. We will now consider the cause to which nearly all other freaks of the bath are due—*organic matter*. The solution gradually becomes charged with it through the medium of the collodion, and to a small extent, perhaps, from imperfectly cleaned glass, and the dust of the atmosphere. When present in any considerable quantity, the silver is reduced over the entire plate, and of course the picture is indistinct and misty. The effect is seen particularly in the shadows, which instead of remaining bright and transparent, become veiled and foggy. Loss of vigour and intensity accompany the fogging, and the negative is unfit for printing. The bath acquires organic matter from the time it is first used, and hence gradually becomes altered from its normal condition of purity.

The first negatives made from it are of course the best, and when it becomes so foul that the pictures are no longer satisfactory, the bath must be put aside till it is thoroughly cleansed and restored to a state of purity. With care and cleanliness on the part of the operator, a bath never goes out of order, except by reason of pinholes or organic matter. The pinholes may make their appearance while the solution still gives fine chemical effect otherwise; or the picture may become flat, thin, and misty from organic matter before the pinholes are visible. When the solution is only half iodized as has been before directed, pinholes will not generally show themselves till the bath has ceased to work satisfactorily otherwise.

The water used in preparing a bath should be the purest obtainable. Distilled water is the best when condensed in a worm and receiver, that do not make it *impure*. Lead pipe will not answer for condensing distilled water for photographic purposes, as the

* In a recent letter, Captain Bonamy calls our attention to the apparent discrepancy between our criticisms upon his pictures and the classification in a recent report of the Amateur Photographic Association, in which his name appears amongst 4th class contributors. The explanation is very simple; he is not a member at present, and the contributions are from some inferior negatives left over from a former year in the hands of the Association.—Ed.

lead oxidizes, and a portion of the oxide is dissolved, and again precipitated as an oxycarbonate when the water is exposed to air. Commercial distilled water is sometimes impure from lead, and a bath made from it will keep turning milky after repeated filtrations, and will not work so long as the turbidity exists. When other sources of pure water are not at hand, every gallery should be supplied with an apparatus for distilling, which may be made of tin with a copper bottom, and a worm of block-tin for condensing the steam. Next to distilled water, that from melted ice is in the state of greatest purity. Blocks of ice that are not dirty or honey-combed should be selected. Rainwater caught in clean tin vessels, or melted snow is also very good for chemical purposes.

Some natural sources of water, such as springs, rivers, and lakes furnish water of sufficient purity for the photographer's wants. If the water is soft and free from vegetable and animal matters, it will answer for the purpose of making baths. When the purity of water is suspected, a bath prepared from it should be set in the sun for several hours, and if a trace of organic matter be present it will first darken the solution, and then settle to the bottom as a black powder.

At the beginning of this chapter we have directed the bath to be made of the strength of fifty-five grains of nitrate of silver to the ounce of water. Such a strength of the bath is best when the temperature is between 70° and 75°, but in very hot weather when the thermometer rises to 80° or 90°, or still higher, a forty-five or fifty-grain solution will generally be found strong enough.

A fifty-five-grain bath prepared in the manner we have recommended, can generally be worked down to a strength of forty grains before failing.

All works on photography, which have heretofore been written, we believe, recommended the replenishment of the bath with fresh silver, in crystals, or a strong solution of uniodized nitrate. This method of proceeding, although it seems rational at first view, and sometimes succeeds in practice, we strongly protest against, and advise the operator never to strengthen or tamper with the bath till it is thoroughly renovated and made over. When a bath has become reduced, the addition of nitrate of silver generally disturbs it, causing the organic matter to precipitate more or less, and for a time the solution behaves worse than before the nitrate was introduced. Neither should the bath be filtered or exposed to light after it has once been put into use for the same reason.

It is very important to have a bath holding a large quantity of solution in order to make negatives perfectly clean, and with ease, certainty, and uniformity. We would recommend the employment of from one and a half to two gallons of solution for the bath. The great advantages of a large bath are, that it works uniformly for a long time, saving much care and labour in its management, and that it gives negatives cleaner and more perfect than can possibly be made from a bath holding only a small quantity of solution. We use a bath holding two and a half gallons, and three hundred ¼ plates can be sensitized in it before the solution becomes so disordered as to require changing. The plate is not allowed to descend to the bottom of the solution, but only half or two-thirds the way—a hole being made through the dip-rod, and a peg thrust in, which rests upon the top of the bath, and prevents the plate from sinking deeper than is required. By this arrangement the fragments of collodion film and other particles of matter floating in the bath, instead of lodging on the plate, sink below it, and greater cleanliness is secured.

The methods of restoring an old silver bath to working condition, will next be considered. A bath, when worn out from use, as has been before stated, is generally saturated with iodide of silver, and charged with organic matter. A considerable portion of the iodide of silver and the whole of the organic matter must be removed before the solution is again fit for use. A very effectual mode of accomplishing the results, and the one we recommend for simplicity, is the following :—

The old solution is mixed with an equal quantity of pure water, when it immediately becomes of a milky turbidity from precipitated iodide of silver. It is then filtered through a double thickness of paper, the liquid running through clear, and the precipitated iodide being left behind on the filter. The solution is then put into an earthen evaporating dish, placed upon the stove, and boiled away to dryness. The nitrate of silver, which remains in the bottom, is then carefully fused. The organic matter will be separated from the solution during the evaporation, and will be observed to collect as a black powder on the sides and bottom of the dish. By fusing the nitrate of silver after the water is boiled away, the organic matter is, to a great extent, carbonized, and rendered totally insoluble. When the dish has cooled, pure water is thrown in and stirred with a glass rod till the nitrate is dissolved, when it is diluted to a strength of fifty-five grains to the ounce, and filtered. The organic matter is thus separated almost entirely, as may be known by the quantity of black and yellow matter left upon the filter. The solution after acidifying—for it must be borne in mind that the acid is driven off by evaporation—is ready for use.

The nitrate of silver, which it is necessary to add in order to bring the bath up to its original strength and bulk, should be thrown into the evaporating dish, and boiled with the rest of the solution.

From this extract, our readers will be enabled to judge of the clear practical style of the book, which we commend to their attention.

THE AMATEUR'S MANUAL OF PHOTOGRAPHY.

Edited by Richard Kingham. London: Thomas Kingham.

This is a very respectable book for beginners, and contains some chapters which will be read with interest by the advanced student. The best chapter is on "Instantaneous Photographs," from which we make one or two extracts. The chapter commences by enforcing the old doctrine, that no new secret is to be detailed :—

All those wonderful instantaneous productions, which must have frequently delighted his eyes and fired his ambition, are produced much in the same way, as the most complete failures of the most unsuccessful meddlers. He will, therefore, see that if the same materials are used in each case, it must follow that success in this, as in every other branch of photography, is dependent, not upon secret processes, but upon attention to all the little and apparently unimportant points of detail in every part of his operations. We would therefore advise the student eager to succeed in this most fascinating department of photography, to work well and long at the manipulatory details of the proceeding chapters, and on no account to venture out of doors, until he can with constant success produce perfect negatives at home. When this most desirable end has been attained, we would advise him to try pictures from some upper window, commanding a range of not less than 100 yards; never mind the prospect—let it be of chimney tops, for even these most uninspiring objects can be made extremely interesting to him as studies of light and shade, when tried under the varying conditions of morning and evening light, and the monotony will be frequently broken by the eagerness to get into the picture some beautiful but rapidly changing cloud effect. In this kind of preliminary practice, the pupil will acquire much to help him in his after and more important ventures, for he will soon ascertain the limits that confine his operations.

The well-known sources of success, pure chemicals, good light, and rapid lenses, so familiar to our readers, having been referred to, the writer of this chapter concludes with the following advice on the artistic part of the subject :—

Remember that the most perfect manipulation is utterly useless, unless, besides, there is taste. How frequently an indifferent photograph, but possessing pictorial qualities, is admired by all who see it; whilst another, perhaps faultless as a photograph, is completely offensive to the eye of the man of taste, because it is utterly destitute of all those qualities which go to the making of a good picture. Hitherto, so much attention has been devoted to the chemical part of photography, that no time has been left for that artistic cultivation of the eye so imperative to the painter, and therefore equally necessary to the photographer who desires to rank as an artist also. The pupil will, therefore, do well to read all the works on art within his reach. He will soon be amply repaid; for reward will be in proportion to the exertion. His vision will be wonderfully extended. Objects before so common as to be invisible to the mind's eye will stand out with a new distinctness. He will be surprised to find how few materials are needed to make a picture—that whilst others travel hundreds of miles to photograph some distant scene, and return with results worthless as pictures, he can, in a journey of a few miles, pick up charming bits which at once arrest the attention of all who see them, and he will be amused at the eager inquiries of the less observant, who will want to know where such spots are to be found; he will, in fact, find that the *picture* is truly in the eye of the artist, be he painter or photographer; for without the power to see the beautiful in combinations of light and shade, and outline, all his labours will be worthless. The pupil would do well, therefore, in purchasing every now and then some of the photographs of our best artists—Wilson, Bedford, and others—when he will find almost as strong an individuality in their productions as is to be found in the works of the best painters. He will also have a standard of excellence before him, which will inevitably act as a spur to urge him on from good to better. Finally, let him remember that besides all the art-education necessary to produce really good works, nothing great will be done without painful, plodding perseverance, and an inexhaustible stock of patience. Failure must ever act as the whetstone on which to sharpen up his flagging zeal, and if he work in the right spirit it will be worth more to him than his greatest success.

FURTHER REMARKS ON THE USE OF LEAD SALTS IN CONNECTION WITH GALLIC ACID.

BY M. CAREY LEA.*

In the remarks lately communicated to the Philadelphia Photographical Society on the subject of the use of lead salts to augment the developing power of gallic acid in connection with positive printing, I called attention to the fact that the same influence would doubtless be efficacious in the development of negatives.

Since then, I have made experiments in this direction. When acetate of lead is added to a solution of gallic acid, a considerable quantity of acetic acid is requisite to re-dissolve the precipitate which forms. In positive printing by development, this large excess of acetic acid is no objection, but rather an advantage, so much so that I have been in the habit of adding rather more than was necessary to effect complete solution. But in developing collodion negatives it would be objectionable. In the experiments which I have lately made, I therefore rejected the acetate, and substituted the *nitrate*. This salt is not so powerful an accelerator as the acetate, but has the great advantage of producing no precipitate. I believe that this is its first introduction into photographic use.

The experiments were eminently successful. The new developer was found to act slowly and to require a longer exposure than an iron developer. But the negatives exhibited the finest details, and were exceedingly bright and clean.

The course which I recommend is as follows:—Make a solution containing

Gallic acid	...	...	50 grains
Nitrate of lead	...	...	100 „
Water	...	...	10 ounces.†

and filter it. This solution with me kept for several days until it was exhausted, and probably would keep for some time longer. Expose the plate as for a pyrogallic development. The bath and collodion which answer best are precisely those which work best with an iron developer, viz., a bromo-iodized collodion and a bath with the faintest possible trace of nitric acid. For example, add ten drops of nitric acid to an ounce of water, and take a drop of this very dilute acid to each five ounces of silver bath. When this development was tried with a simply iodized collodion (iodide of sodium), the negative was too hard, the details in the high lights were obscured before those in the dark shadows came out. I speak here, of course, of the lights and shades of the original view.

To observe the peculiarities of this mode of developing, a plate was exposed with a very small stop for forty-two seconds, and when developed with iron was found to have had exactly the right exposure. The development required about half a minute. Immediately after, another plate exactly similar was exposed similarly, but for eighty-five seconds, and was developed with gallic acid and nitrate of lead. The picture came out slowly, and required about six minutes for development. When about half developed, the liquid was poured off, and a strong dose of silver solution added (proportion, nitrate of silver ten grains, citric acid twenty grains, water one ounce), and the whole poured again on the plate. After the lapse of six minutes from the first application, the original developer was still perfectly clear, although wine-coloured, and could have been kept on for some time longer without fogging.

Of these two negatives, that developed with the gallic acid and lead salt was the most pleasing in appearance: was the cleaner, brighter, and sharper of the two.

For albumen, collodio-albumen, and many sorts of dry plates, I think this mode of development will be found to possess material advantages. I propose to make experiments in these directions, and would be glad if some one familiar with the Fothergill process would try this mode of development, or that with acetate of lead, and report the results.

* Read before the Philadelphia Photographic Society.

† In metrical weights:—

Gallic acid...	...	...	...	...	...	5 grammes
Nitrate of lead	...	...	...	...	...	10 „
Water	...	...	...	...	...	500 CC.

ON THE CAUSES OF THE FADING OF PAPER POSITIVES.

BY MM. DAVANNE AND GIRARD.

The American scientific journals, and particularly "*Silliman's Journal*," contain in recent numbers some observations by Mr. Carey Lea, an eminent chemist of Philadelphia, on this subject.

In the article he has published, Mr. Carey Lea does not positively contradict the facts which we believe we established, but he regards them as not fully proved.

The first point upon which he insists is the following:—That it is not quite certain that the fading of positives is due to a sulphuration. Such an opinion may well seem paradoxical, for during the past ten years proofs have freely accumulated to show the influence of sulphuring compounds upon positive pictures. So, to combat Mr. Carey Lea's opinion, it will be sufficient for us to recall the principal facts upon which we have based the views now adopted by all photographic chemists:—

1. Every faded proof contains sulphur.
2. Every proof newly prepared, left in contact with sulphuring compounds, fades and turns yellow.
3. The simultaneous influence of sulphurizing compounds and water is necessary to produce these phenomena.

In the second place, Mr. Carey Lea attacks the explanation we have given of the yellow colour of faded positive proofs. The explanation we gave was as follows:—Sulphide of silver, violet black under ordinary conditions, assumes a yellowish brown colour when formed in presence of organic matters such as are employed in sizing positive papers, and particularly gelatine, albumen and starch.

Mr. Carey Lea considers this fact insufficiently demonstrated; he thinks we might as well admit that the yellow portions of the proof are due to very finely divided sulphide of silver; and to establish this view, he bases it on the fact, that the addition of a sulphurizing compound to an exceedingly weak solution of nitrate of silver always gives a similar result, whether the solution contains organic matter or not.

It is so in fact, and we readily acknowledge it, but only when the solution of nitrate of silver is extravagantly diluted. When, for example, we operate with a solution containing only 1-10000th of silver, the colour is the same, whether we add organic matter or not, but such a dilution has no relation with the weakest half tone of the proof. If, on the contrary, we operate with a solution containing 1-1000th, 2-1000th, or even only 1-5000th of silver, the result is widely different in the two cases. If the solution is simply aqueous, the liquor becomes troubled, and we obtain, in the course of a short time, the deposit of black precipitate characteristic of sulphide of silver; if, on the contrary, it contains organic matter, gelatine for example, the addition of sulphuretted hydrogen does not cause any disturbance in the liquid, even when the strength is 1-1000th, and we obtain only a yellowish brown colouring without its depositing the least precipitate, even after several days' repose.

This experiment is, in our opinion, conclusive: it proves that in contact with organic matters, sulphide of silver is converted into a kind of yellow lake, partially soluble, as we have shown in our *Researches upon the formation of positive proofs*.

The yellow colour of this lake is moreover easily verified; it is sufficient to spread on a china plate, some recently precipitated sulphide of silver on the one hand, and on the other the magma obtained by precipitating this body in

presence of an organic substance, and leaving the two products to dry: the one becomes violet black, the other ochreous yellow.

There is yet another proof of almost equal value which we cannot pass over without notice. Treated with dry sulphuretted hydrogen, every proof, simply fixed, dried at 212°, is slightly coloured violet black; it tones, and the silver is converted into ordinary sulphide; but when we come to moisten this proof, the sulphide formed combines with the organic matter swelled or dissolved by the water, lake of sulphide of silver is formed, and the proof rapidly fades.

The facts we have stated therefore clearly demonstrate: —

1. That the fading of positive proofs is the result of their sulphurizing.

2. That the yellow colour they assume in this case is due to the formation of a yellow compound, partially soluble, of sulphide of silver and organic matter.

We therefore maintain the conclusions we had previously established.—*Bulletin de la Société Française de la Photographie.*

REPORT OF THE COMMITTEE OF THE "SOCIETE FRANCAISE DE LA PHOTOGRAPHIE" APPOINTED TO AWARD THE ANNUAL MEDALS.

BY M. EDMUND BECQUEREL.

Gentlemen,—One of the most important resolutions you have adopted since the foundation of the *Société Francaise de la Photographie*, is unquestionably that of which now propose to make the first application. The annual distribution of honorary medals cannot fail to become in your hands a powerful lever whereby to aid the progress of the science and art of photography, while it will at the same time enable you to maintain the legitimate influence which you have been in possession of for the past ten years.

The committee you appointed in January last to enquire which were the works most worthy of recompense in 1864, have encountered in the accomplishment of your commands many difficulties which have caused their Report to be delayed until the present day.

If you refer to the programme you adopted last year, you will recognize that a great number of secondary questions had not been foreseen. Thus, it is not only the examination of the works responding to the object of the society that the committee have considered; it has also had to examine and solve the principles, under your approval, of a great number of important points.

One of the difficulties the committee encountered at the first step was:—Within what limit of time must the works the society intend to reward have been published? Upon this subject opposite views were entertained: some members of the committee wished, for the first year at least, to go back to the origin of photography, and award to the most celebrated names in our art recompenses certainly well merited: others, on the contrary, wished to limit just to the preceding year the works susceptible of being rewarded. These opposite opinions appeared to us to possess serious inconveniences, and both have been set aside, and the committee adopted the following principle.

The medals to be awarded for works accomplished during the preceding year, or which, begun at a more remote period, have been finished during the past year, or, finally, which dating from any period whatever, have received the final sanction of practice during the past year.

There would still remain the case where the publication in the year of a work which, of itself, had not appeared sufficient to be rewarded, would come to furnish an occasion of reviving and recompensing previous works of greater importance.

As a result of this first principle comes the following resolution:—The works accomplished during the year, but which have not received the sanction of practice, may take a share in the distributions of following years, for generally we can ascertain the real value of a process only after a certain lapse of time.

Two other resolutions, also adopted by the committee, sufficiently explain why certain names, to which the works of those who bear them have given a deserved notoriety, do not figure among those we propose to recompense.

In the first place, as laid down in the programme you adopted, the works intended for competition for special prizes, such as the prize founded by M. le Duc de Luynes, have not been included in the distribution of the annual medals.

In the second place, the members of the administrative council have been considered as absolutely excluded from this distribution.

It is in consequence of these resolutions, and after having carefully examined the works which appeared to fulfil the conditions laid down, that the committee propose to award this year four medals to the persons whose names here follow in alphabetical order.

M. Blanquart Evrard.
M. Niepce de Saint Victor.
Major Russell.
Warren de la Rue.

The works accomplished by the parties named are too well known to the society and to the readers of our *Bulletin* for it to be necessary for us to describe them, a few words will suffice to show the principal claims these names have upon your choice.

M. Blanquart Evrard communicated to us, in the months of January and June, 1863, his researches upon the intervention of art in photography, and the advantages that may be derived from the judicious employment of the vapours of iodine to locally modify a negative, and change the effect at pleasure. M. Blanquart is also one of the veterans of photography, and we cannot overlook the influence, in popularizing photographic productions, of the printing establishment founded at Lille by his care.

The publication of a work by M. Niepce de Saint Victor upon the application of anterior researches upon heliochromy to photography has appeared to us an occasion for recompensing an indefatigable inquirer who, ever since the origin of photography has been constantly at work, and who, among the principal claims to the gratitude of photographers, reckons upon the employment of albumen and of glass in photographic processes.

The name of Major Russell, although new in the photographic world, is no less known. His tannin process is now widely if not generally employed; this process is simple, practical, easily performed, and gives excellent results. The inventor, who first published his description of it in 1861, published another in 1863, and the numerous modifications he introduced into several chapters, particularly in that on developing, constitute in reality a new process.

For about ten years Mr. Warren de la Rue has devoted himself with unparalleled perseverance to the study of astronomical photography. Apparatus of large dimensions have been specially constructed by him for this purpose, by which magnificent photographs of the moon, sun, planets, and fixed stars have been obtained, and, thanks to the labours of this *savant*, the representation of the stars by light, which some experimenters had previously attempted on a small scale, and possessing no scientific value, has become one of the interesting and brilliant applications of photography.

The conclusions of this report were unanimously adopted.

THE FRENCH PHOTOGRAPHIC SOCIETY.

At the meeting of this society, the last of the present season, held on the 5th inst., M. Wothly, of Aix la Chapelle, exhibited some positive proofs obtained by his process, without salts of silver or hyposulphite of soda. These specimens were examined by the members present with a lively interest, and excited much admiration.

M. l'Abbé Salvy exhibited some positives which he obtained without the employment of hyposulphite for fixing. The process he employs to obtain them, he describes as follows:—

"In the first place, let me say, that it is to Sir John Herschel that I owe the idea of this process. Many years ago he stated that if we print under a negative a sheet of paper covered with a solution of citrate of iron, and then float it on a silver bath, we obtain a picture on it. These indications, perfectly correct be it said, give but very mediocre results; so, without abandoning a mode of printing which appears to be very promising, I applied myself to improving it, and after numerous researches, I succeeded in obtaining the proofs now before you, which have not perhaps the excessive delicacy and brilliancy of albumenized proofs, but which, on the other hand, present a richness and softness of tones which can never be obtained by ordinary processes.

"Instead of floating the paper on the silver bath after exposure, I combine the salts of iron and silver, and then expose.

"My liquid is composed as follows: I put into one bottle—

Water	100	parts
Oxalate of iron	6	„
Citrate of iron	10	„

And into another bottle—

Water	100	parts
Nitrate of silver	6	„

I mix the two solutions; a precipitate of silver is formed, and the clear portion is the sensitizing liquid.

"A sheet of paper is covered with the solution by means of a soft brush, or it may be poured into a dish, and the paper floated upon it. It is then placed between folds of blotting paper, and afterwards exposed. The picture taken, it is washed in several clear waters, and afterwards immersed for a few minutes in a bath containing a few drops of ammonia.

"The tint of the proof varies according to the degree of humidity in the paper. If employed dry, it is of a very fine orange colour.

"When we acidify the liquid by means of acetic, oxalic, or citric acid, we obtain proofs presenting two perfectly opposite tints. To this end we allow only the deepest shades to come in the positive frame, with just a commencement of the half-tones; the tone is deep brown; then the picture is exposed to the fumes of ammonia. All the details immediately appear of an orange yellow colour, which can be changed by means of chloride of gold, or better with *sel d' or*, employed in the proportion of 1 part salt to 3,000 parts water.

"The time occupied by these operations is from 20 to 25 minutes, from the sensitizing to the entire finishing the picture. The paper that yields the best result is Turner's, prepared for Talbotype; this is probably due to the sizing."

M. Marion presented to the society a series of blue proofs, obtained upon paper prepared with prussiate of potassa accompanied with the following note:—

"The proofs I offer to the Society have been obtained with paper prepared mechanically with ferro-prussiate. It is after many attempts that we have succeeded in giving the essential qualities to a practical process. The proofs thus obtained are blue, which leave nothing to be desired as to hue. The operation is extremely simple. The paper, as prepared by me, is exposed under a negative to the luminous rays: the exposure must be rather long, varying from twenty to thirty minutes in the sunshine. After exposure, the uniformity of the tint of the paper is scarcely modified; originally of a bronze green, it has become only a little deeper in the shades: the picture is however formed, although scarcely visible: washing in pure water causes the picture to appear. The washing being made in a small quantity of water, two contrary and very curious effects are produced: in proportion as the whites are freed from the blue colour that covers them, the water charged with it carries and distributes it appropriately over the half-tones and shades of the picture.

"The blue proofs are toned black by immersing them in a solution of 4 grammes of potassa in 100 grammes of water: when the blue colour has completely disappeared and is replaced, under the action of the potassa, by a yellow colour, the proof is immersed in a solution of 4 grammes of tannin in 100 grammes of water: the proof tones quickly; when it has acquired the desired hue, it is dried between two sheets of blotting paper. The hue may be modified by floating the picture on a solution of tartaric acid, and removing it instantly.

"We believe that with time, experience and deeper knowledge, we shall arrive at processes of toning superior to that now described; we have hopes also of improving the quality of the paper. Meanwhile we show with what great facility we obtain, without embarrassing preliminaries, blue proofs of such hues as leave nothing to be desired."

M. Girard read the report of the committee on the annual medals.

The several propositions of the committee, relative to the conditions which the works judged worthy of recompense must fulfil, were put to the vote and adopted.

Each of the names proposed by the committee was then put to the vote, the result was that the four medals given this year were awarded to the following persons named in alphabetical order.

M. Blanquart Evrard; M. Niepce de Saint Victor; Major C. Russell; Mr. Warren de la Rue.

The report of the committee was ordered to be printed in the Society's *Bulletin*.

M. Blaise exhibited a number of carbon prints obtained by M. Poitevin's process, as modified by M. Fargier. He described the method of obtaining them as follows:—

Prepare the following solution:—

Water	100	parts
Gelatine	10	„
Bichromate of potassa	1	„
Indian ink	*quant. suf.*	

After solution by aid of a bain-marie and filtering, the mixture is poured on the plates placed on a levelling stand, and spread uniformly with a brush. Next day the plates are sufficiently dry to be exposed under negatives. The time of exposure is difficult to indicate; one minute in sunlight to fifteen minutes in the shade, is about the average.

The picture is developed after the gelatine film is covered with a thick film of collodion, by being immersed in boiling water, which soon melts the gelatine. When the picture is detached a glass plate is applied above it; the film thus imprisoned between two plates is easily turned; it is reimmersed in the water, after removing the glass carrying the picture: then, after a washing in cold water to remove the last impurities, a sheet of gelatined paper can be applied to it and the picture attached without much difficulty; it now only remains to drain the picture and dry it between folds of blotting paper.

Upon the conclusion of the business the meeting adjourned to the 4th of November.—*Bulletin de la Société Francaise de la Photographie, Aug.*

THE HYGIENE OF PHOTOGRAPHY.

BY M. CAREY LEA.*

I have long desired to make some observations on the subject of the influences of photography on health, and the increasing attention which this subject seems to be attracting abroad, leads me to hope that remarks upon it will not

* From the *Philadelphia Photographer.*

be altogether disregarded even in this country, where we are thought to be so reckless of life and health.

On entering the working-room of a professional photographer, one is apt to be saluted by a penetrating and, at first, almost overpowering odour. In this combination a chemical nose can generally distinguish acetic and nitric acids, ether and alcohol. I propose to consider these substances in succession.

Acetic acid, only when very much diluted, as in the form of vinegar, can be considered to be innocuous. In a more concentrated form, it is highly irritating and unquestionably pernicious. Acetyl, the radical of acetic acid, appears to have an irritating nature, which passes into all its compounds, and shows itself especially in those which it forms with the halogens. Chloride of acetyl is so irritating as to cause immediate blood-spitting when inhaled. But because acetic acid exists in vinegar, and vinegar may be swallowed without injury, people are too apt to attribute to acetic acid a harmlessness which it does not possess.

The vapour of *nitric acid* is not merely corrosive, but is directly poisonous. It is only very lately that this direct poisonous character has been recognized. The terrible accident which happened to Mr. Stuart and his assistant, in England, both of whom died in consequence of sopping up acid spilt from a broken bottle, has thrown a new light on the matter, and has recalled other cases which, if less marked, were still similar.

Now there is not the least need that the odour of either of these acids should ever contaminate the air of the working-room. They are frequently produced by the practice of setting old acid negative baths on the stove to evaporate down, or other equally improper acts. Much the best course with negative baths that have ceased to work well, is to place them aside in convenient vessels until they accumulate, then throw down the silver as chloride, wash it with a few waters, add sulphuric acid and a few lumps of zinc until the silver is completely revived, wash with hot water, and dissolve the silver in nitric acid for positive printing. It requires but little acquaintance with chemical manipulation to accomplish this. The nitrate of silver need not even be crystallized. Weigh the silver after drying it, dissolve it in nitric acid, using a quantity not quite sufficient to take up all the silver even after standing several days with it in a warm place. If it is wanted in an ammonio-nitrate bath, the ammonia may be added at once. If a plain nitrate bath is to be made for fumed paper, add a little bicarbonate of soda until the solution is faintly alkaline, and then drop in seven drops of nitric acid for each ounce of metallic silver; to obtain the right dilution, compute in round numbers seven ounces of metallic silver as equivalent to ten of nitrate.

I have made this brief digression to show how poor an economy it is to mess with spoilt baths, and how much time as well as health is saved by treating ten or twenty at once as above. Those who treat them by evaporation, simply transfer the impurities from the bath into the atmosphere, and thence into their own bodies.

The other prevailing odours are those of *alcohol* and *ether*. Alcohol is probably not very injurious in the quantity respired, but ether is very much so. Pour a little ether upon a handkerchief, and hold it over the mouth. The person so treated presently becomes perfectly insensible. Is it at all probable that so potent an agent can be respired even in a dilute form, especially as a habit, with impunity? The anodyne influence of ether is too well known in medicine to render such a supposition possible, and there can be no reasonable doubt that its influence is most injurious.

All these odours may be got rid of, if not wholly, at least nine-tenths. Acetic acid need never be used, except in very dilute form. In the developer, one-twentieth of acetic acid is abundance, instead of which it is often used as high as one-fourth, thereby keeping up a never-ceasing smell through the working-room. Nitric acid, by avoiding its use as far as possible, in fact, except a few drops for acidulating baths, it need never enter the working-room. Even for cleaning plates, there are other substances which can take its place. Ether is far more difficult to keep from the atmosphere. The best plan is to separate a portion of the dark room by sashes, one of which is to be opened sufficiently to enable one to work conveniently. The plate is collodionized inside, while the photographer stands at the door. The upper portion of the glazed portion must communicate by an opening with the flue of the chimney, and it is better to make some provision for conducting fresh air into this glass chamber, independently of the sash. This is the plan which I have myself adopted, and I can say from experience, that the slight draft which is requisite for carrying off the vapours, does not injuriously affect the drying of the plate. The system answers admirably.

There remain other substances which may be briefly despatched. Of cyanide of potassium I have only to say that photographers should endeavour to dispense with it altogether. The reckless manner in which this substance is employed is utterly wrong and unjustifiable. Some years ago, M. Davanne was nearly killed by it, and was only saved by long-continued pouring of cold water down the head and spine. A little which he had rubbed on his fingers had got into a cut. Lives are constantly lost by its use. Two cases have been lately mentioned in the English journals.

Iodine and bromine are less in the atmosphere of the work-rooms than in the days of the daguerreotype, Both, especially the latter, are irritant poisons. They differ, however, from prussic acid in this, that the latter substance, when united with an alkali to form cyanide of potassium, retains its dangerous qualities, whilst iodine and bromine in their alkaline combinations are quite innocuous. In the free state they are highly irritating, and provoke inflammation of the lungs. Iodine is still a good deal used in certain processes for strengthening negatives, and when so used, it should be done either in open air, or in the glass chamber already described.

Finally, I may observe that there is a great deal of self-deception in the matter of health. Because a man has been exposed for a length of time to noxious influences, and has not materially suffered, he is too apt to underrate their importance, and yet a poison, if it enters the system for a sufficient time, no matter how small the quantity may be, ends by producing its characteristic effect. What is less volatile than lead or its carbonate? and yet the painter who is constantly exposed to an atmosphere in which this substance is contained, even to such an inappreciable extent, ends by having his health gravely compromised. In a vast number of cases, when a man's health is impaired, he does not himself know what to attribute it to. A consumption is considered to be the result of a cold, or of a constitutional tendency, when it is perhaps in reality traceable to the slow but long-continued action of acetic or nitric acid. The long-continued use of cyanide may terminate in paralysis, ascribed to any other reason than the true one. Photography is so new an art that the specific diseases arising from a misuse of its materials, are not as yet understood. Is it not then worth while to take a little care which, in a short time, will cease to be an effort?

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

I now pass, in conclusion, to the behaviour of mixtures of the haloid salts of silver. The data furnished by other investigators upon this subject have been mentioned above. My own researches relate to—

The Behaviour of Mixtures of Iodide and Bromide of Silver.

I have already shown that bromide of silver by itself is

* Continued from p. 404.

photographically weaker than iodide of silver by itself. In order to ascertain how a mixture of the bodies would behave, I mixed solutions containing 10 per cent. of iodide and bromide of silver, in the proportion of two parts of the former to one of the latter, prepared papers in the mixture, and sensitized them in the same way, as above described, for the preparation of papers with iodide and bromide of silver alone.

Strips of the paper thus prepared were exposed simultaneously with others with iodide of silver, and developed with pyrogallic acid. From eight concordant experiments, it appeared that the bromo-iodized papers became coloured more rapidly, and rather more deeply, than merely iodized papers.

Bromo-iodized paper was also more strongly affected when in contact with silver solution, than simply iodized paper moistened with the same solution.

These experiments prove that a mixture of bromide and iodide of silver is more sensitive to light than pure iodide of silver, even when pyrogallic acid is employed as a developer (in opposition to the opinions of Sutton and Liesegang).

I cannot yet give any explanation of this peculiar influence; but, considering that nitrate of silver assists the sensitivity, that even the strip of iodized paper which had been immersed in chloride of sodium, and which contained a trace of chloride of silver (formed by the action of the chloride of sodium upon a trace of retained nitrate of silver) showed a somewhat increased sensitivity, the preparation of daguerreotype plates with chloride of iodine (Moser); and, lastly, that bromide of silver mixed with iodide exalts the sensitivity, I think *that all silver salts chemically decomposable by light, when mixed with iodide of silver, are capable of increasing the sensitivity of the latter.*

I have now to speak of a series of remarkable phenomena, which have been long observed both upon daguerreotype and photographic plates, and which are comprised under the title of—

Phenomena of Solarization.—According to Moser (*Pogg. Ann.* lvi. p. 217), when an iodized silver plate is exposed for a short time in the camera, and then to mercurial vapours, the latter are deposited upon the insolated spots, and a positive picture is obtained corresponding with the original in its lights and shades; but if the plate be allowed to remain longer in the camera, the mercurial vapours produce a negative picture, in which the light parts of the original appear dark, and the dark parts light. "Consequently," says Moser, "when light acts upon iodide of silver, it communicates to it in increasing proportion the modification enabling it to condense mercurial vapours; but if it acts beyond a certain time, it deprives it of this modification again."

This singular phenomenon has been described under the name of "solarization," and similar observations have been made upon collodion in practical photography. It has been noticed that, up to a certain point, the negative plates become blackened in the developer proportionally to the intensity of the light; but that parts of the plate which have been too strongly illuminated do not acquire a deep blackening in the developer, but remain yellowish-red and transparent. For the closer examination of these remarkable phenomena, I made the following experiments:—

1. Two strips of iodide-of-silver paper were fixed in a book and exposed to direct sunlight for two hours, when they were drawn out a little, and again in one hour; after half a minute longer exposure, the whole was carried into the dark closet. The different portions of the papers were, therefore, exposed for three hours, one hour, and half a minute. In the developer, the portions exposed for half a minute became darkest; the portion exposed for an hour was lighter, and that exposed for two hours lighter still. Hence, according to this experiment, the maximum of photographic action was attained in half a minute.

The same experiment was at the same time made with bromide of silver, and with this also it proved that the maximum of photographic action occurred within half a minute's exposure.

The duration of the exposure was then limited to shorter intervals. I prepared two very carefully planed boards, and pasted paper on them, forming a fold round one of them. Upon the lower horizontal board I fastened down the strips of paper with iodide and bromide of silver, &c., side by side, covered them with the other board, and then brought the whole into the light. The upper board was then pushed off sideways, half an inch at a time, so as to expose successive portions of the papers to the action of light.

I first fastened down a strip of iodized and a strip of bromized paper parallel to each other, and pushed off the covering-board (in the diffused light of the blue sky, at ten o'clock in the morning of the 10th of April) at intervals of 5, 5, 5, 2, 2, 1, ½, ¼ minutes. The iodide of silver became grey, and the bromide of silver pale violet; the grey colour of the former increased during the intervals of ¼, ½, 1 minute, but afterwards remained the same; with the bromide, on the contrary, the chemical colouration increased in proportion to the time of the exposure. The reverse was the case in the developer; in both papers the parts exposed for a quarter of a minute acquired the strongest colour, and all the rest were weaker the longer they had been exposed.

From this experiment, it appears that the chemical and photographic colourations are not parallel: for the former is proportional to the time of exposure, whilst the latter showed itself most intensely upon the portion which had been illuminated for the shortest time.

In a second experiment of the same kind, in which I exposed the papers to the diffused light of the clear-blue sky for intervals of 15, 10, 5, 5, 2, 1 seconds, so that the portions gradually exposed were illuminated for 38, 23, 13, 8, 3, and 1 seconds, I found that the photographic colouration increased from 1 to 13 seconds, remained nearly the same in the following interval, and then again diminished; and this was the case both with bromide and iodide of silver. Here, therefore, the maximum of action occurs between 10 and 23 seconds. On the same day I made a second experiment at noon, when the maximum of effect occurred even in 10 seconds. During exposure in a moderately light room, the maximum was only attained in 1 minute.

On another (likewise bright) day, I found the maximum both with bromide and iodide of silver at 10 seconds, thence to 20 seconds the colouration remained nearly the same, and then it gradually diminished.

In a subsequent experiment the strips were exposed at intervals of 1, 1, ½, ¼, ⅛, and 1/12 minute. In this case the colouration attained its maximum in the second interval (15 seconds exposure), after which it gradually diminished.

In the afternoon of the same day, an experiment was made at intervals of 2, 1, 1/6, 1/8, 1/8, 1/8, 1/8 minutes. The maximum of photographic colouration occurred in 40 seconds; it remained the same up to 50 seconds, and then a gradual diminution took place. This experiment shows how the time within which the maximum of colouration is attained varies according to the strength of the light.

The discrimination of this maximum is, however, attended with great difficulties. The eye is indeed capable of detecting small differences of intensity in pale colours, but not in intense ones (Bunsen); for this reason the intervals must not be made too short. I therefore tried leaving the papers for a short time only in the developer, until they were faintly coated. But this did not answer the purpose; for at first they usually became coloured proportionally to the time of exposure, and the above-mentioned differences of colouration only made their appearance subsequently; the chemical colouration, proportional to the illumination, acquired by the bromide paper, was also somewhat injurious to the result: and possibly some influence may be ascribed to the paper, which is likewise a little blackened in the developer, and indeed the more intensely the more strongly it has been illuminated.*

* In the fixing-bath all these strips lose a little of their intensity; this is especially the case with the bromide paper.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, August 24th, 1864.

Of the four annual medals awarded by the *Société Française de la Photographie*, two have fallen to the lot of English photographers, and the choice is such as must win general approval. Major Russell, for his dry collodion and tannin process, and Mr. Warren de la Rue, then, are the first recipients of a distinction which we are sure will be duly prized. M. Blanquart Evrard receives a medal for services rendered to photography since its first discovery, and especially for his "Essay on the Intervention of Art in Photographic Results;" and M. Niepce de Saint Victor was awarded for his persevering labours, and especially for his application of albumen and his heliochromic researches. It will be remembered that the candidates for M. le Due de Luynes' prize were excluded from this award.

There appears to be a latent desire to avoid the use of salts of silver in the production of paper positives, as is shown by the constant production of other processes, more or less satisfactory. Among the most promising is one brought forward at the last meeting of our Photographic Society by M. l'Abbe Salvy. The proofs obtained by his process, which is really based on a suggestion made by Sir John Herschel in 1840, are quite remarkable. They possess all the qualities that render silver prints so valuable, but also exhibit a greater variety of tones, and, moreover, are quite permanent. The specimens exhibited consisted of landscapes, portraits, and copies of engravings, &c.

M. Blaize, of Tours, also exhibited some very fine specimens of carbon printing, which are nearly equal, if not quite, to Mr. Swan's productions. He employs M. Poitevin's process, as modified by M. Fargier.

M. Grüne has made some interesting experiments on the photogenic properties of chloride of copper; he observed that a copper surface, when cleaned with hydrochloric acid, rapidly tarnishes even after being well washed with water, and it never acquires as much brilliancy as when cleaned with sulphuric acid. This fact had been known for a long time, but no one attributed it to the influence of light. M. Grüne having repeated this experiment several times upon ordinary kitchen utensils, thought one day of preparing a copper-plate in a similar manner, exposing it to the direct rays of the sun, and covering it with an engraving; after a few minutes' exposure, the design appeared on the copper as a negative, and remained visible on the plate for an hour exposed to diffused light, but gradually faded. Repeated experiments satisfied the operator that commercial hydrochloric acid is preferable to that chemically pure. Other experiments confirming the sensibility of chloride and bichloride of copper, permit M. Grüne to establish the following principle:—If we mix a concentrated solution of sulphate of oxide of copper (blue vitriol) with a solution of bichloride of zinc, a milk-white precipitate of perchloride of copper is formed, *which blackens when exposed to light.* This precipitate is sensitive only as long as it remains moist: it loses this property upon drying, and pictures obtained with it fade as they dry, and no means have yet been found of fixing them. It is very much to be desired, however, that the photogenic properties of chloride of copper may be rendered available to the photographer, for if this metal could be substituted for silver, an immense economy would be effected.

THE PATENT BLINDS.

Sir,—I am reminded of two old proverbs which run, "It is a long lane that has no turning," and "But of evil sometimes cometh good," by your article in your last journal.

It is you, Mr. Editor, whom I have to thank most sincerely for having thrown the only ray of reason on the subject of my blinds now under dispute. Your criticisms, although most severe and condemnatory, are, beyond all doubt, the calm and deliberate conclusions of an intelligent and conscientious mind; and but for you I might not have had the chance of vindicating my own cause, for I could never have condescended to reply to the transparent twaddle that has been launched from other sources.

It seems to me that through all this paper war, you are the first who have probed the subject to its vital part; but like the surgeon who wounds to heal, you had previously administered the soothing chloroform that has removed all pain.

I quite agree with you, Mr. Editor, that it is beginning at the wrong end to dispute about a point that may be worthless and decides nothing.

If the merits and details of the working of the blinds have not been known to the photographic community, it has been through no fault of mine (although it was no part of my duty to give detailed descriptions of working); yet I consented to do so when I was solicited to read a paper at the Manchester Photographic Society.

It has always been my wish that the utility of the blinds should be as universally known as possible, and I did not patent them for the sole purpose of money making, but rather to claim the credit of that which cost me so much thought and money. I have been ridiculed by professional photographers for presuming to have any method of excluding the sun than by the ordinary blinds, and I was told that it was impossible; thus much is admitted *to-day* that was considered impossible a *few years since*, and now I am told there is nothing in it. It seems to me there is nothing in anything we clearly understand, but I know it has cost me a large sum of money to test my system of ligthing.

Mr. Webster's opinion I consider not worth the value of the paper that it was written on, as I can obtain as many counsels' opinions as I am prepared to pay for, and they will be as favourable for me as his is unfavourable. The best opinions I can give for my blinds are from galleries where they are already applied, and could refer to in case of need.

Your condemnation could not be greater when you assert as your opinion that they are "wrong in principle and worthless in practice," and when you specify their various defects, you say, "they obstruct one-third and sometimes one-half of the light," and again, that they divide the light into "small sources," that of itself would be fatal to them, and lastly, that they are not of general value. That such defects may occasionally exist when they are improperly applied, I will admit, but that they must of necessity belong to the blinds, I must emphatically deny.

It has been my study for years to overcome these glaring defects, and others that I might add. Now I am prepared to prove that I have succeeded, and that no other system but mine has any claim to be considered scientific, but are all thoroughly defective, and far behind what we have a right to expect, considering the vital importance of the subject.

I will briefly repeat the advantages of my plan. 1. They will exclude the sun. 2. They considerably *shorten* the time of exposure. 3. They concentrate the light and make it thoroughly homogeneous. Also, they are invaluable as regulators of light for galleries of whatever aspect.

But, Mr. Editor, words prove nothing, and I am willing to put the subject to a test, which I thus propose. Let an intelligent committee be formed, of which you are to be chairman; and if any respectable photographer or amateur, who is building a gallery, will build from my plans, and adopt my blinds exactly as I shall propose, I am willing to give my time and labour to direct their construction, and, when completed, I will abide by the decision of the committee.

If the decision be favourable, I claim the credit of the discovery, which is my due to be published; and if otherwise,

I will agree to bear the expense incurred myself; and moreover, if the patent then be proved and pronounced valueless, I will withdraw it.

This, I consider to be a straightforward proposal, which I make in good faith, feeling convinced of the success of my blinds, and am willing to guarantee their accomplishing all that I say they can do.—I remain, Sir, very truly yours,

Lachlan McLachlan.

Manchester, August 23, 1864.

[Nothing can possibly be fairer than the offer of Mr. McLachlan, and we shall be glad to see it carried into operation, and if necessary to aid with our opinion or judgment in the matter. In the meantime we may remark that we have received a communication this week from one of the ablest and most experienced metropolitan portraitists, who states that he contemplates shortly testing these blinds in a glass house built so as to be especially suitable for the experiment. He promises then to report to us, and also to enable us to form our own opinion. *Nous verrons.*—Ed.]

THE LATE EXHIBITION.

Dear Sir,—I notice in the Photographic News of to-day an extract from the *Reader*, which, in allusion to the unrepresentative character of the late exhibition, refers somewhat incorrectly to the contributions furnished by this department. The statement in question runs thus:—There were "no good specimens of its application to Government purposes, the only contribution from the Government photographer being a single plate illustrating the effects of shot and shell upon iron armour-plates."

With regard to this assertion, I beg leave, in the first place, to point out the fact that *eight* pictures or plates, mounted in two frames, each containing four subjects, were exhibited by us; these were all illustrations of the kind mentioned above, and showed the relative powers of different projectiles against the plates of the *Warrior*, and other constructions of iron defence. The limited space at the disposal of the Exhibition Committee was urged as the reason for their not accepting from us any other photographs than those already specified; but, if accommodation had been afforded, there would have been no difficulty on our part in furnishing several other contributions of a military character, and of general interest. A series of this kind was shown a few months since at the *soirées* of two or three scientific societies, and could have been placed at the disposal of the Council of the Photographic Society, if that body had evinced a desire to receive them. Further, inasmuch as we cannot claim to be the only photograph-producing department under the direction of Her Majesty's Government, it is not unreasonable to suppose that the branch establishments at Chatham, Kensington, Greenwich, and Southampton, would have been equally ready to send contributions illustrative of their respective photographic operations, if only application had been made to the authorities for this purpose; and thus an interesting collection of works for the most part of an original character, might have been secured, all referring to widely different applications which, from their nature, would not be likely to come into injurious competition with the works of the metropolitan professional photographer.

With this reservation I fully concur in the opinion expressed by the *Reader*, to the effect that the late exhibition was deficient in its representative character, and was, in fact, altogether unworthy of a national society.—I am, dear sir, yours very truly,

John Spiller.

Royal Arsenal, Woolwich, August 19th, 1864.

[The absence of a truly representative character in the late exhibition must be admitted and regretted by everyone, but we think that it was more due to the limited space than to anything else, although, doubtless, other causes were in operation.—Ed.]

HINTS ON CHILDREN PORTRAITURE.

Sir,—This most important branch of the photographer's art is not generally so well understood as it might be. Some operators look at it with horror, and others, on the contrary, treat it with too much triviality, whereby they obtain more failures than successes. I will endeavour, by your permission, to submit a few rules, in order to ensure constant success under ordinary circumstances. I shall not enter into the question of chemicals, except to recommend the use of acetate of lead in the developer, which I find beneficial in my own practice. Assuming, then, the chemicals to be in thoroughly good working condition, begin, if you please, by letting the child alone; don't play with it, nor allow others to do so, so as to make it hot and tired before you commence; but, as I said before, let the child with its nurse, remain in the dressing-room until you are quite ready. Then, kindly and firmly, but without much ceremony, place the child and any accessories required in the required position. Don't let any one address the child in any way whatever, leave him to himself and a toy, focus him, draw up the dark slide, and have some one on your right or left side, to call the child's attention by playing a moving toy. You must not address the child by any means; let him take no more notice of you than of an accessory. Now watch quietly until you see the child is motionless, take the *cap off*, and before he moves, *put it on again*, for it is preferable to have an under-exposed picture than a double portrait. It is often wise to use a binocular or shifting front, and try another plate at once.

Before, however, you leave the glass room, see that the child be removed from it as well, or at all events from the platform, especially if a rest has been used, for the heat of the former, and the arrangements of the other may render the child uncomfortable and restless; and once got out of temper, you cannot catch him again so soon.

Be sure to take the cap off the lens without hesitation or perplexity, but with a sudden bird-like motion; for if you uncover it partially or slowly, you will have in the background of your picture the spectre of all the surrounding objects (another way, by the bye, to make the ghost.) I generally, when I cannot use the instantaneous shutter, hold it immediately above the lens.

Don't use comic or striking toys; they make the child laugh or cry, and they are over too soon. Don't give or mention sweets, as they make the child's mouth watery, and cannot keep it still. If the child is above infancy, you may say, that "a pretty bird is going to come out from the lens, after one, two, and three;" and if you keep a sharp look out, and be quick in movements, you will be sure to catch something better than a bird. The background should be of a light neutral tint, place light accessories here and there, to balance well with the high lights of the portrait. Blue blinds are very useful if skilfully arranged, especially when the sun strikes on the roof.

With this method, I have succeeded very well with children under two years of age; sharp brilliant pictures, and oftentimes in exquisite and characteristic attitudes.

P. Taglia Cozzo.

THE FOTHERGILL PROCESS.

Sir,—In your number of the 5th inst., you mention Captain Bonamy's method of working the washed albumen process. I have tried it slightly modified, and find it most valuable and successful.

No dry process can surpass the tannin in ease of preparation and certainty of result—*provided the plates are not kept in hot weather beyond a certain period*, dependent, I should think, upon the chemicals employed, but seldom exceeding a week or ten days. After this time they become provokingly uncertain, and transparent spots show themselves, the result, no doubt, of the silver inevitably remaining in the film attacking the iodide.

In the climate of Italy this is a most serious matter; as an

excursion in the mountains will seldom extend to less time than the plate will keep in its pristine beauty, and the results are in consequence disastrous. I had a whole batch of plates which I lately exposed upon some of the grandest scenery around Monte Rosa, and which had been kept about a month, disfigured in the way I have mentioned.

Yet these were thoroughly washed quite as much so as is recommended by most tannin workers, and should iodide of potassium or salt be employed to combine with the free silver, the plate immediately acquires a degree of insensibility quite incompatible with the faithful representation of a landscape.

In the washed albumen process, on the contrary, we have the albumen and the bromide of potassium combining with the free silver, thereby forming an innocent compound, besides being one which is sensitive to light.

I confess I do not fancy the idea of dosing the plate with silver after the albumen is washed off, as recommended in your article, for I doubt not that this proceeding will offer a most effectual barrier to even three days' keeping in summer.

However, without the silver, I have kept these plates a fortnight, which, with the thermometer at 96°, as it is now, would be simply destruction to a tannin plate, at least, as I prepare it; and I can assure you, sir, that on development they were as clean and free from spots or stains as on the day of preparation, so that I hope this old process will be really revived by the very valuable suggestion of Captain Bonamy, of adding bromide to the albumen; and I, for one, sincerely thank him for letting it be known.—Faithfully yours,

N. Jocelyn,
British Legation, Turin. Secretary to the Legation.

[Our correspondent will see from a further communication that Captain Bonamy removes the nitrate solution by another wash, which aids keeping qualities.—Ed.]

THE NATURE OF LIGHT.

Sir,—I am not exactly satisfied with my last letter, inasmuch as it does not convey the entire meaning I intended it to do. In using the words, "even to this our mortal life," I intended this argument, that our physical senses of sight, hearing, feeling, tasting, and smelling, can take cognizance only of those physical operations of nature which belong to the matter of which we ourselves form a part. It is only by the exercise of our reason that we can attain to any knowledge of the primitive forces of nature, our senses only appreciate the effects of their operation upon the various matter composing our earth: thus the sun's rays are not of themselves either luminous or heating, although to our senses of sight and feeling, they are both, these phenomena being in reality produced in our own atmosphere, and not extending beyond its boundary; it is certainly a great blow to the believer in ghosts and spirit rappers the fact, for fact it is, that our animal senses are of the earth, earthy, and can have knowledge of nothing but what belongs to gross matter, which we are told ghost are not.—I am, sir, respectfully yours, T. A.
Yarmouth, August 9th, 1864.

Photographic Notes and Queries.

Remedy for Pinholes.

Sir,—Since I wrote to you to know the cause of pinholes in negatives, I have tried several experiments, and have found out the cause of failure. I stated to you when I wrote to you last, that I had tried many baths, and many samples of collodion, and could not get any better result than a negative full of small pinholes. I have tried all these baths and collodions again, and still they have hundreds of pinholes. I must tell you now that I have discovered a remedy, and all the same chemicals that failed now work as well as possible. Now for the method of remedy. In the first place, I got a tin case made to go all round my bath trough, which is a porcelain one, that will carry a full-plate glass 8½ by 6½. This tin case I fill it with pieces of broken ice about the size of walnuts, and that keeps the solution cold: once filled answers for one day. I refill it with ice each morning; I also have a tin case for my collodion bottle. I find this is the remedy for pinholes, and secures clean bright negatives. The way I proved this was by using part of the chemicals kept in the ice, and part of them out of it in the hot dark room; the one was all I could wish for, the other the great failure, full of pinholes, as stated above. If you think this will be of any use to your readers who may be troubled with the same kind of thing, you are at liberty to make what use of it you please. I am, Sir, yours truly, J. C. S.

[Our correspondent will find, on referring to an article on p. 278 of the present volume, June 10th, that we pointed out this cause and remedy for pinholes. We are glad for the sake of many readers to have this practical confirmation of the matter. The examples enclosed fully attest the value of the remedy; one print being covered with minute pinholes, and others with same chemicals made cold are clear, brilliant, and perfect.—Ed.]

Photography on Wheels.

Sir,—Seeing a drawing of dark box in the last Photographic News, I take the liberty of sending a drawing of one I have worked with this last two summers. I have walked with it through North Wales, and have tested it well. The box is of half-inch pine, and painted white outside, black inside; it measures 24 inches long, 30 deep, 18 wide. There is a false *bottom* about 8 inches from the bottom of box, under which a drawer slides to hold bottles, camera, and negatives; the negatives I carry in small cardboard frames one on another in a partition of the drawer; the small bottles of chemicals fit in pockets in the top box while working. I screw the box on three small 18-inch wheels, same as a perambulator, when wanted.—Sir, hoping I have not troubled you too much, I remain yours respectfully,
August 20th, 1864. Black Art.

Talk in the Studio.

Mr. Pouncy's Carbon Process.—Mr. Pouncy favoured us with a call a few days ago, with some further specimens of progress in his printing-ink process. The prints were exceedingly fine both in colour and gradation; the purity of the lights now leaving nothing to be desired. He has succeeded in overcoming all the difficulties in transferring, and now removes the image from the tracing paper on which it is originally taken, on to any mounting paper he may desire. He also showed us one or two lithographs, the image on stone being obtained from negatives after nature. The results were very good in many respects, possessing considerable half-tone, and so far as we could judge from a cursory examination without comparison, as good or possibly better than most attempts in this direction which we have seen.

Solar Camera Enlargements.—The modified solar camera of Dr. Van Monckhoven described in our pages a few weeks ago, promises to be very successful, both in its pictorial and commercial results. The inventor is in this country at present with some exceedingly fine specimens, and is superintending the fixing and arranging of the new apparatus in Mr. Mayall's new studio at Brighton. When it is in operation we shall, availing ourselves of the kind invitation of Mr. Mayall, make an examination, and report upon the results, which, from the specimens already produced on the continent, promise a high degree of success. With the new combination devised by Dr. Van Monckhoven as an enlarging lens, great delicacy and perfection of definition is obtained, and entire immunity from distortion, and with the largest achromatic condenser, there is sufficient light to print an image fully out on albumenized paper in twenty minutes. The doctor regards the fuming process as increasing the sensitiveness of the paper. We understand that the sales in Paris of the instrument have been already very large.

Reducing Over-Printed Proofs.—A correspondent, Mr. J. Ashley, informs us, that working with a new sample of paper more sensitive than usual, a large batch of prints were completely spoiled, the faces being as black as the dresses should have been. Instead of throwing them amongst the waste he tried the plan of M. Haure, recently described in our pages, and found that it completely restored them to the proper depth, giving fine, delicate, well-toned prints, in no wise inferior to

those not requiring such treatment. He encloses a print which fully bears out his statement, being of excellent quality.

Photography and War.—*Humphrey's Journal* remarks that war is good for the professional photographers. "The fact that each one of our braves, before offering up his life on the altar of his country, has his picture taken, makes business for the operator, the stock dealer, and all others connected with them."

American Prices.—*Humphrey's Journal* has the following:—"What do our Northern operators think of the prices charged in the loyal Southern States (or rather the restored Southern cities) for vignettes, payable in greenbacks. *Ten dollars per dozen!* That was the price in Natchez, July 2nd. Here (New York) our operators work for a mere song, pictures are cheaper in New York than anywhere else. Why don't you raise your prices to, say 5 dollars per dozen for vignettes, and 4 dollars for cards? In justice to yourselves you ought to do so." In London, without a war or depreciated currency, some of our best photographers obtain prices as high as those in Natchez. Some obtain a guinea for six cards, and a guinea and a half for six card vignettes; whilst some, we believe, do them as low as 5s. a dozen.

Accident to a Photographer.—The *Times* records a serious accident to a photographer, named William Oldfield, by a fall from Hunstanton Cliffs. Resting awhile from his operations, he had fallen asleep on the top of the cliffs, and rolled over, falling on to the rocks below, a distance of sixty-five feet. He was very seriously injured, and his recovery doubtful.

To Correspondents.

N.—Uniodized collodion kept in full well stopped bottles, and especially if it have been preserved from the light, will often remain good for years. Something, of course, depends on the original character of the soluble cotton, and of the ether; but, in any case, it is well worth iodizing a portion, and trying it: sometimes such a sample, if it do not work quite well alone, may be added to a new sample with advantage to both. 2. The case you mention of developing a wet plate 5½ hours after exposure, is curious; had the film dried, or was the nitrate of silver crystallized on the surface? We had not tried the effect of platinum with the mercury, but are interested in hearing the result.

A. R. P.—If the engraving be copyright, which, being of a modern painting, it most probably is, it is illegal to take a copy of it at all. The fact that the prints are for private circulation lessens the risk of a prosecution, but does not remove the illegality. If you had stated the name of the publisher of the engraving, we might, possibly, have known if it were copyright.

Inquirer.—There are several excellent manuals for beginners. "Practical Photography," published by Bland and Co. (now Negretti and Zambra), and Mr. Hughes' "Principles and Practice of Photography," both contain very lucid instructions for beginners. As to a lens, if you could afford it, we should recommend one by one of the good English makers; but if the price, as you state, be a consideration, you may get a pretty good French portrait lens at a low price. You need not apologize for consulting us; we shall always have pleasure in assisting you. How is it that your letter is dated December, 1863?

W. D. S.—We believe there is no rule amongst London portraitists as to the hours of closing, except convenience. They will receive sitters as long as there is light to take portraits, and the assistants will remain until each day's work is done. The hours during which it is possible to work are necessarily very short in winter, and thus compensate for occasional long hours in summer, when, as a rule, work will not be done until seven or eight o'clock. Some London portraitists close at two o'clock on Saturdays; but not all.

J. Cooper.—We have occasionally seen samples of similar defect, but cannot suggest a remedy. We believe it to exist in the albumenized paper. 2. The plan for your glass house seems good, but you will lose some light by having the roof of the dark portion rather higher than the lowest part of the glass roof.

W. W. S.—For the lens No. 1, for the camera No. 4.

H. Paioa.—If you send us an example of the defect to which you refer, we may possibly be able to assist you, but we are unable from your description to determine the cause. 2. We are uncertain of the year in which photographic portraiture on paper began to be practised, probably about 1843, and, if we remember rightly, by Mr. Henneman.

J. Daniel.—You have far too much direct front light, which gives a flat effect to your picture, and you slightly over-intensify.

Artist.—The defect appears to arise from irregular and over-rapid toning, probably from using a bath too recently mixed.

P. S. S.—The system of blinds best suited to a room like that recently described as having been erected by Mr. Fitch, will be as follows:—For the slanting roof have three sets, one white and one black, or dark blue, side by side, so as to cover the whole, to run up from the bottom. You can then cover one-half or more over head at will, and you can also, by having one or two sets completely down, make the light always reach the sitter from an angle, instead of coming directly from the front or overhead. The blinds for the side lights should be made to slide laterally, not to pull up and down. As you have plenty of light, you should make free use of the blinds, so as to obtain your light a concentrated source.

L. A. D.—We wish very much we could impress upon correspondents the importance of sending us samples of the defects for which they require remedies. Unevenness in the sky may proceed from many causes; the film may be mottled and uneven from the quality of the collodion; the plate may be dirty; the developer may not flow evenly, and other causes may be in operation. If we had seen a print we could, probably, have readily arrived at a conclusion. It is very probable, indeed, that both your troubles will disappear with a change of collodion. Get a good sample of bromo-iodized collodion, which will give you greater immunity from many kinds of stains than you now possess. 2. We generally find that the toning bath, with chloride of lime, works well three or four days after it is mixed, but we have known cases where it required to be kept a few weeks.

Edward Wyse.—To give the recipes you require in full in this column would require more space than we can devote to answering all our correspondents. You will find them repeatedly given in different numbers of the News during the last few months, or you will find them in a collected form for ready reference in our last Year-Book.

C.D.—The fault is chiefly in the negative. Perhaps a print a little better than either No. 1 or No. 2 might be obtained, but a good print could not be obtained from the negative. It is probably thin, and does not, in fact, contain a sufficient number of well-marked gradations to give a good print. If it be printed deep enough to get good blacks in the deep shadows, the half-tones in the shadows are lost, and all looks black together. If printed lighter, there is no half-tone in the face, and no real blacks at all; and if any attempt be made to tone the lightly-printed impression to a black, it acquires the faded washed out, and almost foggy look of No. 2. By printing on a weaker silver bath, in diffused light, and not attempting to tone deeply, a more passable print might be obtained from the negative. 2. The defects in No. 3 are from faults in the albumenized paper.

Carbonate.—As your silver is precipitated in the form of a carbonate on adding carbonate of soda to the bath, it necessarily follows that nitrate of soda, which is soluble, remains in solution, and as this, of course, renders it useless to attempt to ascertain the amount of silver present by means of an instrument which merely estimates the density or specific gravity of the solution, as, of course, the density is increased by the nitrate of soda in solution. In order to test whether the whole of the silver is precipitated, observe if no further turbidity occurs on adding the carbonate of soda: or add a little common salt; if no cloudiness or precipitate is caused, you may be satisfied that all the silver is precipitated as a carbonate, which must be washed and dissolved as directed. 2. If you have added excess of sulphide of potassium, the addition of a little silver solution will produce a black precipitate. 3. So long as there is insufficient of the sulphide added, the addition of more to the solution after it has settled will cause a fresh precipitate. 4. Your negatives are under-exposed; and the figures might be a little easier and more graceful in arrangement.

A. G. Grant.—Received with thanks.

W. Tilley.—Thanks for your communication, which shall be duly considered and noticed.

Frederick Breton.—Thanks for the parcel of fine specimens which have just come to hand. We shall have more to say in our next.

J. Ashley.—The article referred to on "Printing on Ivory" is in the number for April 12th, 1861. It is in print. Thanks for your communication.

Proto-Iron.—Excess of iodide can only be removed from the nitrate bath by diluting the solution with an equal bulk of distilled water, filtering out the precipitate, and then adding nitrate of silver to make up the proper strength.

Failure.—If your chloride of gold be absolutely neutral, the solution will tone without any addition whatever. The addition, in such case, of a sample of acetate of soda having an alkaline reaction will set up a decomposition which will issue in the reduction of the gold. Any tendency to purple colouration in the solution indicates the reduction of gold. If the gold solution be neutral, and fail to tone without any addition, try the smallest quantity of your acetate.

Philip Henderson and several correspondents in our next.

Photographs Registered during the Past Week.

Mr. Jabez Hughes, Ryde, Isle of Wight,
Photograph of the Queen.
Two Photographs of the Queen and Prince Albert Victor.
Two Photographs of the Queen and Prince William of Prussia.
Two Photographs of the Queen, the Princess of Wales, and the Princess Louis of Hesse.
Two Photographs of the Princess of Wales and Prince Albert Victor.

Mr. Stuart McWatters, Graham's Road, Falkirk,
Photograph of the Rev. Mr. Waide, and Session of the United Presbyterian Church of Falkirk.

Mr. Arthur Wyatt, West Place, West Street, Fareham,
Five Photographs of Bishops Waltham, on the occasion of H.R.H. Prince Leopold's visit to the town.

Mr. F. W. Evans, 246, Old Kent Road, Surrey, S.E.
Three Photographs of the Rev. A. W. Snape, M.A.

Mr. John Frew, 7, Railway Terrace, North Shields,
Two Photographs of Henry Anson Brightman, Esq., Imperial Royal Austrian Consul.

Mr. Henry Guy Inskipp, Sevenoaks, Kent.
Photograph of R. Quinton, Esq.

Messrs. Minshull & Hughes, Eastgate Row, Chester,
Photograph of the Interior of Mold Church, Flintshire.
Photograph of the Interior of Hooton Church, Cheshire.
Photograph of the Interior of the Cathedral, Chester.
Photograph of the Interior of Bishop Lloyd's House, Chester.

Messrs. H. Petschler & Co., 84, Market Street, Manchester,
Photograph of the Manchester Assize Courts.

Mr. Charles Sands, 13, St. James's Street, Brighton,
Photograph of the Grand Hotel, Brighton.

Mr. Edward Reeves, 159, High Street, Lewes,
Photographic Group of Cricketers, the Lord Mayor and Town Council of Brighton, Sussex. August 1st., 1864.

Mr. William Ponsty, 18, King Street, Hereford,
Photograph of Old Radnor Church.
Photograph of Harpton Court, the residence of the late Sir George Cornewall Lewis.

Mr. Cornelius Waddington, Burnley, Lancashire,
Photograph of St. Peter's Church, Burnley.
Photograph of General Scarlette.

Mr. A. Goodchild, Bath Street, Redcar,
Photograph of the Rev. G. M. Fenton.
Photograph (Group) of the Rev. T. Postlethwaite, and the Rev. G. M. Fenton.

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 313.—*September* 2, 1864.

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REPRODUCTION BY PHOTOGRAPHY.

It is a fact, which we are somewhat at a loss to explain, that in this country we are decidedly behind other parts of the world in the application of photography to purposes of reproduction. We do not hesitate to affirm that the reproduction of works of art is one of the most important functions of photography, perhaps in some respects its most important function of all. In undertaking this office it obtains sanction even of the most captious of its critics, and is regarded as a valuable handmaid to art. Some years ago, Mr. Tom Taylor, the art-critic of the *Times*, declared the finest engraving by the ablest master to be infinitely inferior as a reproduction of a painting to a good photograph. The *Athenæum*, which for some time past has never failed to administer a kick to photography when occasion offered, in two distinct articles in its last number intimates a conviction that photography is driving out line-engraving. Some of our best painters such as Millais, Sant, and Noel Paton, have painted pictures with an express view to their reproduction by photography; and yet the fact remains that in this country this branch of the art is less practised, less popular, and less successful than it is in other countries.

It is a fact that in this country we have no professional photographer whose name is solely associated with photography as a speciality—we except of course from this remark that of Mr. Thurston Thompson, who, however, as photographer to South Kensington Museum, scarcely comes within the category of professional photographers practising commercially. The admirable copies of Raphael's cartoons, Turner's pictures, &c., by that gentleman, and the copies of pictures by Mr. Annan for the Art Union of Glasgow, attest that the ability for such work is not wanting amongst our own photographers, and renders the inferior interest in, and the comparatively small practice of this branch the more remarkable.

In France it may be said with much truth that photography is rapidly taking the place of engraving. Mr. Bingham, who is *facile princeps* in this branch of the art, has photographed for publication a very large number of the best modern paintings, and the photographic copies have, we believe, a large circulation; moreover, his copies of French paintings are imported into this country, and have, we believe, a good sale here, both plain and coloured. How is it, then, that the same custom does not prevail in this country with regard to the works of English painters? We believe that one of the reasons is an impression on the part of many English painters that photography is incapable of translating colour into monochrome without doing it some injustice. Probably the attempts they have made in this direction have been entrusted to incompetent hands, and they have become disgusted with the result. The productions of Mr. Bingham completely dissipate any notion of the imperfect character of photographic reproductions from paintings. We have before us a selection of his masterpieces from modern paintings, including the productions of Meissonier, Yvon, Tissot, Louis Knaus and others, with which he has recently favoured us. Some of these would have seemed the most unpromising subjects for photography. Here, for instance, are the battle pieces of Yvon: the storming of the Malakoff, and the battle of Magenta, rendered with a perfection of tone and gradation which can leave nothing to desire; there are no incongruous renderings of colour, no want of detail, delicacy, or harmony. So with the wonderful *genre* pictures of Meissonier. So much has it become a matter of course with this artist to paint with a view to publication by photography, that in some instances he has painted in monochrome expressly with a view to photographic reproductions; but what is most singular on this part of the subject, Mr. Bingham informed us, that the ordinary pictures of this artist painted in colours yielded the best results. Another cause has, probably, contributed to hinder the practice of photographic reproduction in this country. The painters themselves rarely think of publishing copies of their works: speculators in pictures, and publishers of engravings, have generally undertaken the publication of important works, and they for various reasons have had a prejudice against photography. In the case to which we have been referring, Mr. Bingham is the publisher as well as the photographer, purchasing the right to publish in this way from the painter or owner of the picture. We understand that this system pays both the painter and the photographer satisfactorily. Is it not worth while for some of our skilful photographers to make reproduction from similar paintings his speciality, and endeavour to establish a system of publishing in this country?

Then there is another system of photographic reproduction, for publication of a most important and valuable character in an educational aspect, which has received but little attention in this country, we refer to the copying of rare and choice engravings from the best masters. There are few things better calculated to cultivate and elevate the taste in art than familiarity with the works of the best masters. To attain that familiarity, even through engravings, is not within the reach of a majority of even those who have taste to enjoy such works. The system of reproduction, carried out with such completeness by Herr Gustav Schauer, of Berlin, then becomes most important and valuable. The system and the extent to which it is carried was described in our columns recently by Mr. Osborne, and we have now an opportunity of speaking personally of the results. We have before us a series of large quarto volumes and portfolios containing about two hundred examples of the works of the best masters, with text descriptive and critical, by able writers on art. The portfolios are devoted to the gems from

different collections, which are thus kept together: thus we have the album of the Munich Gallery, the album of the Vienna Gallery, of the Berlin Gallery, of the Florentine galleries, of the Dresden galleries, of the Art Treasures in Venice, of the Madrid Gallery, of the St. Petersburgh Gallery, and so on. Each gallery is represented by some of its choicest pictures: thus we have in the Dresden Gallery the celebrated "Sistine Virgin," by Raphael; the "Nativity," by Correggio; the "Tribute Money," by Titian; "A Madonna," by Holbein, and another by Murillo; Vandyck's "Charles the First;" Rubens' "Lion Hunt;" "Rembrandt and his Wife," by himself; the "Marriage at Cana," by Paul Veronese; and Battoni's "Penitent Magdalen." Each print is magnificently photographed from as perfect an engraving as could be obtained, the copyrights being in many cases purchased by Herr Schauer for the purpose. The size of each print is about whole-plate, neatly mounted on good boards, with a margin of india tint, and the title of the picture very neatly printed in English, French, and German, underneath. There is also a title page, index, and a few pages of well-written letter-press, historical, descriptive, and critical; in our copies these are in English, but there are German and French editions as well.

In addition to these, Herr Schauer has issued similar albums devoted to the works of special masters: thus we have before us a handsome volume entitled "The Rubens Album," consisting of twenty choice examples of his works, with fifty pages of dissertation on his works, by Dr. Wagner. A "Meyer Album," containing examples of the works of Herr Meyer, a modern German painter of *genre* pictures. This contains, instead of critical remarks on the pictures, verses on the subjects they portray. Besides these albums and portfolios, we have a large series of card pictures from the same works, which are very admirable, as suggestive memoranda of the great works.

We have two especial objects in calling the attention of English photographers to this great work, undertaken by Herr Schauer, besides recording the issue of such reproductions, as a matter of general interest. We wish to ask, in the first place, is there any English photographer who will do as much for this country, its galleries, and its masters, as Herr Schauer has done for almost every part of Europe? We do not ask if any one will publish in a fragmentary fashion copies of such pictures as he may have access to readily; but will any one undertake the work systematically, obtaining the very best impressions to copy, and giving the work at once completeness and artistic value? We know that such a work would be of great value to the public, and we feel assured that it might be made remunerative to the person who should undertake it in a worthy manner.

In the next place, we earnestly call the attention of photographers to such a means as Herr Schauer's series presents of aiding their art education. Here they may secure such studies, pose, and arrangement, composition and chiaroscura, as the greatest masters in all time have left behind them, and from which they may gain more ideas of art, and suggestions for its application to their own work, than they can from scores of written articles on the subject. Let all who care about good pictures for the abiding and never-cloying pleasure they afford, or for the influence which the study will have upon their work, avail themselves of such aids to art culture.

Some of the Canadian photographers, we are glad to record, are inferior to none in reproduction. A few months ago we received some examples from Mr. Notman, of Montreal, together with some of the most charming landscapes from Nature, which we have seen. The reproduction of paintings include a wonderfully charming picture by R. S. Duncannon, illustrating Tennyson's "Lotos Eaters;" one of Vicat Cole's fine landscape with figures, a "View in Surrey," and a cattle piece by Verboekhoven. Nothing more perfect than each of these is possible. We have also received some exceedingly perfect reproductions recently from Marshall and Co., of Boston, U.S.

We should like to see this subject obtain more attention, and excite more interest in this country, and we hope that at any future photographic exhibition, reproduction will stand foremost amongst the subjects to be distinguished by a medal.

THE COLLODION PROCESS TWELVE YEARS AGO.

IT will be a matter of some interest to the curious to compare the collodion process, as worked on its first introduction, little more than a dozen years ago, with the present practice of the art. As most photographers know, the process was discovered in the year 1850, and the first published account of it given to the public in the *Chemist*, in the year 1851. It was not until the following year, that Mr. Archer published a complete account of the process in a pamphlet, dated 1852, and published by the author at 105, Great Russell Street, Bloomsbury.

This little work is now very scarce;* we have not seen more than two or three copies of it, Mr. Archer having himself, we understand, endeavoured to buy in the edition whenever opportunity occurred. His motive for that step, we cannot, of course, pretend to point out, but it has been suggested that the motive might be found in certain passages of the book, making admissions which he was afterwards anxious to recall. One of these is a phrase found in the preface, in which collodion is spoken of as a modification of paper, and another passage which runs thus:—

> It is difficult to say who first attempted to use collodion in photography, and it will hardly be a matter of much importance to pursue this inquiry; but the first publication in which it was alluded to, was that of M. G. Le Gray, of Paris, and then only incidentally, as a substance which might possibly be made available.
>
> There is no doubt that many tried it previously to this, but as their experiments produced no results, and led to no practical end, their claims to the first use of collodion cannot be considered of much value.

Regarding the origin of the process, we think the claims of Mr. Archer, as the practical discoverer, are pretty well settled. That it had been suggested, and even tried before his experiments, there can be little doubt; we believe that Mr. Bingham, now of Paris, was one of the earliest experimentalists in that direction. If we remember rightly, he was at that time an assistant to Professor Faraday, and was engaged in the earliest experiments in which collodion was produced. Being at the same time a photographer, he employed the new material in some of his photographic experiments. Unfortunately, we have but meagre record of them: the earliest allusion to the matter was, we believe, in an early edition of his work on "Photogenic Manipulation," dated 1850. In this work we find, amongst other processes on glass, a method almost identical in detail with Archer's. It consists in obtaining pictures with isinglass, by iodizing a solution of it with proto-iodide of iron, coating a plate of glass with the warm solution, and when set, immersing it in a solution of nitrate of silver. After exposure in the camera, which sometimes produced a slight visible image, the picture was developed with a solution of proto-acetate of iron, and fixed with hyposulphite of soda. After describing this process, Mr. Bingham gives other substances which he has been able to substitute for the isinglass, and which, as he says, "answer moderately well." These substances are vegetable gluten, *collodion*, several of the gums, &c. This, it should be borne in mind, was published in January, 1850, upwards of twelve months before Mr. Archer's first publication. Mr. Archer, however, first brought the matter to a practical issue, and gave the process to the public in a definite form, and with his name the discovery will always be mentioned. It should not be forgotten, however, that the process was thus far detailed before his discovery, nor that in his early experiments he had associates; to Dr. Diamond, as the first who produced

* The scarcity of this little work, and its interest, has induced the editor of the *Photographic Journal* to reprint it in his last number *in extenso*, remarking that practically it may be regarded as having been originally a privately printed book.

presentable collodion photographs of which we have any specimens in existence, is also due, in a degree only second to Mr. Archer, the honour of the practical discovery of the collodion process.

We have repeatedly been asked the question, "What led to the discovery of the collodion process?" Mr. Archer, in the preface to his little work, says a few words on this subject which we shall quote :—

It will, however, be as well to say a few words in reference to the various experiments which led me to adopt collodion as a material so well adapted for receiving the chemical agents necessary in this beautiful art.

In the account I published in the *Chemist*, of March last year, the difficulties attending the use of paper were spoken of as being too great ever to be overcome, on account of the unevenness of its texture, and other defects.

These considerations eventually induced me to abandon its use, and seek for some other substance equally applicable; and it certainly is remarkable that a material which may be called a modification of paper should be found so well to answer the purpose required.

My first attempts with collodion were directed to the improvement of the surface of paper, by spreading over one side a thick solution of collodion.

These essays were not successful; for after the necessary washing, &c., in the process, the collodion film did not adhere to the paper sufficiently to be of any use.

However, previous to and during the progress of these experiments, I was trying various other substances as media, for holding the chemical agent, Zyloidin, other modifications of starch, extremely fine paper pulp, tanno-gelatine solutions, and several combinations of albumen. Each had its turn, and it was only after repeated experiments in numerous ways that I decided on collodion, as being the best and at the same time the most available substitute for paper. Its exceeding ease of manipulation, and the brilliancy of the pictures obtained with it, cannot fail to strike every one who sees them, and justifies me in the opinion I entertain of its great value and practical importance.

The strength of the film allows the removal of the drawing from the glass on which it has been produced, and this is a most distinctive feature in the process.

The readiness with which the film can be produced on glass, without the previous preparation so tedious in other processes, also gives it great practical value, particularly to those who have not much leisure to devote to the art.

It is noteworthy here that the idea of transferring negatives, which has been recently brought prominently before the public by the communication of Mr. Swan, recently published in our pages, was always a favourite with Mr. Archer. He here speaks of the possibility of removing the film as a distinctive feature of great practical value, and some of our readers will remember that he subsequently patented a process for transferring the film by the aid of gutta-percha. From another passage in the preface to the work it is clear that Mr. Archer never contemplated that his discovery would revolutionize portraiture, or supersede the work of the miniature painter, so completely as it has done. He says :—

Many imagine that photography may take the place of the painter's art, as more likely to give faithful portraiture, and correct views of character and detail; but it is not in this light that I look upon it as performing its true office, for the character and expression of the features are so continually varying, that in this, as in the painter's art, the same watchfulness and observation of character are necessary, and the same artistic arrangement is required. A certain *general* expression must be sought for. Who has not observed too often in portraiture the want of that *general* expression, the absence of which mars the otherwise correct delineation of the features?

In the formulæ given for the manufacture of soluble cotton the idea of forming a tough film is throughout kept prominent Take the following, for instance :—

Take 1 ounce by measure of nitric acid, sp. gr. 1·450
1 ,, ,, sulphuric ditto, ordinary
80 grains by weight of cotton.

The fibres of cotton must be well separated as in the preceding mode. The two acids are first mixed, and the requisite proportion of cotton added as quickly as possible, and well stirred with two glass rods for not more than fifteen seconds; the gun-cotton is removed from the acids, and plunged into water to undergo the same washings, &c., as in the former recipe.

It will be seen that the cotton is not exposed to the action of the mixed acids, in this last mode, longer than is necessary to saturate the cotton; should the action be continued further, the solubility of the cotton is entirely lost.

Water must not be spared in washing the cotton, for not a trace of acid should be left; the collodion would be injured by any remaining.

It is a common remark amongst old photographers that the collodion process has been altered little in formulæ since its first publication by Archer, and it is only by examining a formula like that we have just quoted that we ascertain how indefinite were the ideas which at that time existed. The temperature, one of the most important points in the manufacture of pyroxyline, is not even named, nor is there any allusion to the effect of water or strength of acids in modifying the character of the result. It is, nevertheless, very apparent that the soluble cotton obtained by the above named recipe would yield a tough strong collodion, well fitted for removal from the glass.

It will be seen in the further extracts which we shall make from the instructions for preparing collodion, that the same indefiniteness prevails. Indeed, from the nature of things it could scarcely be otherwise; precise formula and exact methods can only result from experience, and the young photographer of this day possesses the accumulated results of the experience of years; he has simply to do what others have discovered as necessary to be done. The early photographer required constantly to exercise his judgment as to proportions and modes of operating. Mr. Archer says :—

It will be better for parties to depend upon their own experience after a few trials than to look for exact proportions in a recipe. By taking an ounce or two of ether, and adding the cotton by degrees, and well shaking between each addition, the solution can be tempered to any required thickness.

Also the thickness of the collodion must depend upon the skill and dexterity of the operator, and the season of the year.

In the commencement of the practice of this process the amateur should be careful not to use a very thick solution, especially if the weather be warm, as the quickness of the evaporation and the necessary slowness of his movements would render it unmanageable in his hands.

These considerations render it difficult to recommend any fixed and exact proportions; but whatever may be the thickness of the solution, great care should be taken to obtain a collodion which will, when evaporated on a surface of glass, be sufficiently strong to bear removal when necessary.

The iodizing of the collodion is to be effected as follows :—

Prepare a saturated solution of iodide of potassium in alcohol, say one ounce, and add to it as much iodide of silver as it will take up. Or to one ounce of alcohol add an excess both of iodide of potassium and iodide of silver; after a day or two, and with repeated shaking at intervals to facilitate the operation, a saturated solution of the two salts will be obtained; and if this is filtered off into another bottle, it will always be found ready for use. The first bottle can be kept as a stock bottle, to obtain a still further supply by replenishing it with alcohol, and adding now and then small additional quantities of the two salts.

The quantity of this solution of iodide of silver which can be added to one ounce of collodion must depend upon the quantity of alcohol in the collodion, as I have previously remarked; so that exact proportions cannot be given; but with ordinary care and a little caution there will be found no difficulty on this point; and if, after having put (say) five drops of the solution to one ounce of collodion, it is found weak in colour, more must be added until the requisite density is obtained, which can be judged of by pouring a little on to a slip of glass and dipping it into the nitrate of silver bath.

He also adds :—

A small quantity of bromide or fluoride of potassium, or of arsenious acid, may be added to the solution. However, they do not accelerate to any great degree.

It will be seen that bromides, now of universal use, had been tried as early as this, but were not considered by Mr. Archer of much value. Regarding the use of fluorides, in reference to which we had recently an inquiry from a correspondent, we may here remark that in a recent conversation with Dr. Diamond as to the early experiments made in this direction, he informed us that the salt employed was fluoride of potassium, and that on adding it to the collodion it re-

mained as an undissolved gummy mass, but the alcohol used at that time being simply the rectified spirits of commerce containing some water, a trace of the fluoride became dissolved in the collodion, and the fluoride of silver formed, although soluble, in the nitrate bath, would still slightly affect the character of the film by the small portion it absorbed. The experiments were not carried out with care, nor any record kept, but Dr. Diamond has an impression that the negatives obtained when it was used repeatedly showed some indications of a reproduction of natural colours.

It is somewhat curious to note the primitive modes employed in some parts of the manipulations. For instance, no dipper was used in that day, the mode of working without it is thus described:—

It is advisable to have the glass cut about half an inch longer than the drawing to be made upon it, as a kind of handle, to prevent the fingers touching the film. The collodion is not poured entirely over the glass—the upper portion is left uncovered; with this precaution a greater facility in working the process is ensured, and there is less fear of spoiling a good drawing with finger-marks or other imperfections.

A 30-grain nitrate of silver bath was used then as it is now; but a plan frequently adopted by Mr. Archer will appear strange to many photographers of this day. He says:—

In my own practice of the process, I generally find it more convenient and cleanly to use a glass bath, so contrived as to allow the light to act upon the prepared plate whilst in it, and during the saturation of the film; consequently the two operations are conducted at the same time. The prepared glass, therefore, need not be removed from the bath until the light has performed its part, and the development of the image can be proceeded with.

The development was effected by means of pyrogallic acid, protonitrate of iron, or protosulphate of iron, the former receiving the preference then as the latter does now; and the fixing effected with hyposulphite of soda or iodide of potassium. Intensifying, when necessary, was effected by means of bichloride of mercury, followed by a weak solution of hyposulphite of soda or ammonia; or, if positives were required, bichloride of mercury was used for whitening the deposit.

We will conclude our extracts by giving a condensed description of Mr. Archer's camera for manipulating the wet process in the field without the use of a tent:—

It is a wooden box, eighteen inches long, twelve inches wide, and twelve inches deep, and is capable of taking a picture ten inches square. Externally, it may be thus described:—In front it has a sliding door, with a circular opening in it, to admit the lens; this sliding door enables the operator to lower or raise the lens, and, consequently, the image formed by it, on the ground glass, as the view may require. The two sides have openings cut in them, into which sleeves of india-rubber cloth are fixed, to admit the hands of the operator, and are furnished with india-rubber bands at the lower ends, which press against the wrists, and prevent the admission of light.

The back of the camera has a hinged door, fitted at its upper part with an opening of just sufficient size for the eyes, and shaped so as to fit close to the face. A black cloth is tied round this end of the camera, to prevent any ray of light penetrating at this opening. In the top of the camera, near the front, is inserted a piece of yellow glass, to admit a small quantity of yellow light, and is closed with a hinged door to regulate the quantity of light required.

The interior of the box is furnished with a sliding frame, to support the ground glass or the bath and the prepared plate; and it has a stop, by means of which any focus from three inches to fifteen inches can easily be obtained.

The bottom of the camera is furnished with a gutta-percha tray, about one inch deep, to hold the washings, &c., when the camera is in operation.

Also, the bottom of the camera, at the back, has an opening cut in it, extending nearly the whole width of the camera, and as far in as the edge of the gutta-percha tray.

This opening is intended to admit, when the camera is in use, a light wooden case containing the glass bath, focussing frame, stock of glass, and paper required in the process.

There are various other little contrivances which I have not specified, such as a drawer for the pictures, a shelf for bottles, &c.

This form of camera will admit of the following manipulation:—Having placed it upon a stand pointing to the object to be taken, the hinged door at the back is opened, and the bath is three parts filled with the solution of nitrate of silver; a plate of glass is then taken from the cell and cleaned if necessary.

The collodion is poured on in the manner previously described; when the film has set a little, it is immersed in the nitrate of silver bath, and the lid of the bath is closed down upon it. The next step is to obtain the focus with the ground glass; this can be done whilst the collodion is becoming iodized.

After adjusting the sliding frame to the proper focal distance, the camera must be closed, and the rest of the process conducted by passing the hands through the sleeves, and placing the eyes close to the aperture in the back of the camera, and drawing the black cloth over the front of the head.

By the aid of the yellow light admitted from the top, the operator can carry on the rest of the process. The plate is now ready for the action of light, and is taken from the bath; or the bath itself, with the plate in it, is placed in the sliding frame. The refracted image is at once thrown upon the sensitive plate. After the requisite exposure, the plate is taken from the bath, and the picture is developed with the solution previously described. The progress of this operation can be seen by the aid of the yellow light, keeping the eyes close to the aperture behind.

When, from experience, the picture is sufficiently brought out, a little water is poured on the glass to wash off the developing solution, and the drawing is partially fixed by the application of a small quantity of a solution of common salt.

The drawing may now be removed from the camera without fear of being injured by light, and the remainder of the operations can be conducted outside the camera.

The advantages of a camera of this kind may be thus enumerated:—

It allows the preparation on the spot of the most sensitive surfaces; their immediate use whilst the sensibility is at its maximum; the ready development of the image, and after fixing.

All these operations being carried on consecutively, the operator can, after the first trial, see what results the progress of his labours is likely to produce.

It gives him the power of shading off any portions of the view during the action of the light, by holding in front of the prepared plate and near the lens a moveable screen, or any flat piece of wood, as the case may require; thereby preventing the too rapid action and consequent solarization of the distant portions of the scene. The spire of a church, for instance, pointing upwards into a bright sky, often requires this precaution to prevent its being entirely lost. Other instances of this effect will readily suggest themselves to those at all acquainted with the art.

RAPID COLLODION.

BY L. PERROT DE CHAUMEUX.

In a recent communication I stated my conviction that the formula of a collodion for obtaining rapid proofs was a matter of complete indifference, but that, on the contrary, it was the silver bath that played the principal part. I reason as follows: collodion is of itself an inert body, which plays only one part, that of maintaining a film of iodide of silver on the surface of the plate. Now, whatever the formula employed, whatever the soluble iodide we make use of, an iodide of silver is always formed in the nitrate bath, which, when well washed, will be nearly insensible to light. The recent discovery made by M. Poitevin, of the sensitizing influence of tannin upon inert iodide of silver, seems to me to demonstrate in the most evident manner that the sensibility of this body depends solely upon the substance with which it is in contact, and with moist collodion, this substance is no other than the nitrate bath. If one iodide gives results, which another does not, it is because the salt formed by double decomposition possesses a peculiar action. It is in starting with this idea that I made the experiments described in my previous communication, and the result, as I have stated, has proved my anticipations.

I now have to communicate to you a fact, which corroborates this theory in quite an unexpected manner. One of my friends, to whom I had given the explanations that you have published in your journal, wished to try and neutralize his bath with carbonate of potassa, put into the same bottle—reflected that he thus always obtained carbonate of silver, and that he avoided the trouble of washing the precipitate. When he proceeded to make use of it, he quickly recognized the rapidity and intensity that I had met with myself; but he remarked, that his negatives had no longer their usual aspect, but were harder and more violent in their contrasts

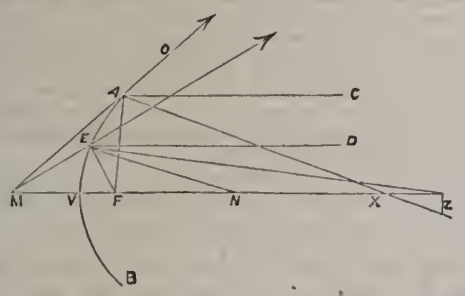
than usual: in a word, they had all the appearance of those obtained with collodion sensitized with iodide of potassium, and yet he had only made use of cadmium and ammonium. Taking the same collodion, I tried it myself with the bath prepared as I have described to you, and this effect has completely disappeared: it reappeared upon putting a little nitrate of potassa into the bath which shows indisputably, it seems to me, all the action of the film of the nitrate bath which covers the iodized surface, and all the importance we must attach to it.

You will pardon me for insisting upon this idea; but as I believe that in seeking rapidity in the formula of the collodion, we waste time unprofitably, it seemed to me *à propos* to notice the fact which, when once known, will not fail, I am convinced, to gain supporters.—*Le Moniteur de la Photographie.*

THE SCIENCE OF A RAY OF LIGHT.*

BY PROFESSOR TOWLER.†

THE aberration of a ray of light is the difference of distance on the axis at which two rays (of which one is infinitely near the axis, and is regarded the standard, and the other is the one whose aberration is to be measured) cut the axis; or, briefly, it is the difference between their conjugate focal lengths. For instance, let Z represent the position of the principal focus of the mirror A B, that is, the focus of parallel rays, and X the position of the focus of some other ray, the distance between these two points, X and Z, is the aberration in question.



Now this distance, X Z, is a very important item in optics, for its existence, according to amount, is the cause of the want of sharpness in the picture so well known to astronomers and astronomical photographers, who make use of reflecting mirrors instead of lenses; it is also partly the cause of the same defect in pictures obtained by the use of lenses.

As the opening of the mirror increases, X continually approaches the mirror, until it reaches the vertex V, when the aberration then is Z V; if the opening be still increased, the aberration will also increase.

When the rays are parallel, the angular opening of a mirror of 120 degrees will produce an aberration whose distance is measured by Z V, which means that the picture of that part of an object produced by the ray C A, will be found at V, instead of at Z.

This item, or distance, can always be found by the mathematician when certain things are known, as, for instance, the radius of the mirror, the distance of the object producing a picture, and the principal focal length.

The principal focal length, or the focal distance of parallel rays very near the axis, is invariably half the radius of the mirror. This focus can always be easily determined by finding the distance of the burning points of the mirror; and when this is found, the radius is also known, being double in amount.

Without entering upon the mathematical discussion of aberration, both for a parallel beam and a divergent pencil of light, I will simply state the results, from which the diameter of the opening of a mirror can be so regulated as to produce the least aberration possible.

Let Z V be represented by f, the distance of V from the object by u, the radius of the mirror by r, and half the distance from A to B by y; V X, or its difference X Z, is required to be found.

The formula for finding this difference, or differential, as it is mathematically denominated, is as follows:—

$$\frac{y^2 f^2}{r}\left(\frac{1}{r}-\frac{1}{u}\right)^2 = \textit{longitudinal}\ \text{aberration.}$$

If the rays are parallel, then $\frac{1}{u}=o$, because u is infinite, and the formula reduces to $\frac{y^2}{4r}$.

Now, supposing r to be a constant quantity, we find that the *longitudinal* aberration in question varies directly as the square of half the diameter of the opening of the mirror.

Let us take an example. Required the amount of spherical aberration of a mirror, whose radius of curvature is 6 inches, and the diameter of whose opening is 4 inches,

$$\frac{y^2}{4r}=\frac{2^2}{4\times 6}=\frac{4}{24}=\frac{1}{6}.$$

Thus the aberration, or Z X, will be one-sixth of an inch, which signifies that the peripheral rays will come to a focus one-sixth of an inch nearer to the mirror than the focus of the central rays.

Let us suppose, however, that the diameter of the opening is diminished to one inch, then the formula will stand as follows:—

$$\frac{y^2}{4r}=\frac{\cdot 5^2}{4\times 6}=\frac{\cdot 25}{24}=\frac{1}{96},$$

which shows that the aberration has thus been reduced to one-ninety-sixth part of an inch; and by reducing the diameter of the opening of the mirror to half an inch, its aberration would be only the one-three-hundred and eighty-fourth part of an inch.

By analogous mathematical processes the *lateral* spherical aberration, Z P, is found for parallel rays to be—

$\frac{y^3}{8f^2}$ = Z P, or its double = $\frac{y^3}{4f^2}$ = diameter of lateral aberration.

Now, let us see what this means; that is, what this lateral spherical aberration signifies.

It signifies that a *point* on the *finest imaginable line*, instead of being a *point* or a *line* in the reproduction, or picture, has been increased in size by means of the reflecting medium to the linear amount of $\frac{y^3}{4f^2}$.

Thus, taking the examples already quoted for longitudinal aberration, let us investigate the amount of the lateral spherical aberration.

First example:—

$$\frac{y^3}{4f^2}=\frac{2^3}{4\times 3^2}=\frac{8}{36}=\frac{2}{9}.$$

This shows that a point o line is magnified so as to have a diameter or width of two-ninth parts of an inch. Our readers will hence comprehend the baneful effects of spherical aberration in the production of fuzzy, indistinct, and unnaturally enlarged delineations.

Second example:—

$$\frac{y^3}{4f^2}=\frac{\cdot 5^3}{4\times 3^2}=\frac{\frac{1}{8}}{36}=\frac{\quad}{288}\ \text{of an inch.}$$

And the mirror, whose radius is 6 inches, and the diameter of its opening being half an inch, has a lateral

* Continued from page 380.

† We have pleasure here in acknowledging the courtesy of Dr. Towler, the able Editor of *Humphrey's Journal*, who forwards us the MSS. of this valuable series of articles in advance of his own journal, for which they are written.—ED. PHOTO. NEWS.

spherical aberration in diameter reduced to $\frac{1}{2304}$ of an inch.

The working optician and the practical photographer will see from the preceding results the limitation of the powers of a reflecting mirror. Summed up, they may be expressed as follows :—

The greater the opening of a mirror, other things remaining the same, the greater the aberration, both longitudinal and lateral.

The shorter the focus, other things remaining the same, the greater the aberrations of both kinds.

Aberrations, therefore, may be reduced by either diminishing the angular aperture of the mirror, or by increasing the focal length.

Finally, since the one-four-thousandth part of an inch is exceedingly small, and scarcely discernible with the naked eye, the mirror and the focal length must be so proportioned as not to produce a diameter of the circle of lateral aberration geater than the $\frac{1}{4000}$ of an inch. Hence the ratio between the diameter of the mirror and the radius of its curvature must not exceed that of 1 to 15, which signifies that, if the diameter of the mirror be I inch, its focal length must be at least 15 inches; or, if the diameter be 6 inches, the focal length must be 7½ feet. If the ratio be reduced to $\frac{1}{20}$, the reader will perceive that this would be an advantage.

Circles can be drawn so as to deviate, to a certain extent, only in a very trifling manner from conic sections: I mean by the words "to a certain extent," a certain angular aperture; and to the limit of this aperture we may then expect that a spherical mirror will almost be as free from aberration as a paraboloidal mirror.

Suppose F, in the figure, to be the focus or burning point of the paraboloid A V B, and the line F A perpendicular to the axis V X; suppose, furthermore, that the arc A V B is within the limit of 1 to 15 when compared with its focal length, when regarded as a spherical mirror, then F A will be the radius of the circle, which will deviate almost imperceptibly from the parabola, both these surfaces having the same focal length and the same aperture. The formula for the amount of deviation between the two surfaces at A, on the line A C, produced so as to cut the two curves, is expressed as follows :—

$$\text{Deviation} = \frac{y^4}{8\,r^3}\,(1+n);$$

but n, in reference to the parabola, has no value; hence the formula stands in reference to this curve :—

$$\text{Deviation} = \frac{y^4}{8\,r^3}.$$

Now, let us see what the result will be with a mirror of 6 inches angular diameter, and a focal length f of 7½ feet. In this case y is equal to 3 inches, and f equal to $\frac{r}{2}$, or r is equal to 180 inches; required the deviation in question?

$$\frac{y^4}{8\,r^4} = \frac{3^4}{8\times 180^3} = \frac{81}{4665600} = \frac{1}{57600} \text{ of an inch.}$$

From this it is evident that the spherical mirror, so limited, is endowed with all the properties of the paraboloidal mirror; and we have the satisfaction of knowing that such spherical mirrors can be most accurately made.

NEW METHOD OF ANALYSING ETHER.

ONE of the chief difficulties of photography, and one of the most frequent causes of failure, arises from the impurity of the materials. Amongst them the one whose composition is most variable is unquestionably ether, and yet it is upon its good quality that the beauty, stability, and adherence to the plate of the collodion film depends. Dealers in chemicals sell it of the same nominal strength, yet, notwithstanding this guarantee, the results vary, for the ether is not what it appears to be.

The densimeter is, in fact, powerless, in the present state of things, to indicate the real strength of the ether. The crude liquid does not, like alcohol, contain two bodies only (alcohol and water), it contains three (ether, alcohol, and water), and the proportion of the two foreign bodies may vary without the densimeter indicating the slightest difference in its specific gravity.

This difficulty of appreciating the value of commercial ether has struck M. Adrian, pharmaceutist, of Paris. Having recognised that the cause of the imperfection in the densimeter was due to the fact that the mixture sold as crude ether contained three substances, he has sought for the means of arriving, by a densimetrical experiment, at a strict appreciation of the value of the mixture.

He operates in the following manner: As ether is a very volatile substance he employs an apparatus which consists of a test tube closed with a ground glass stopper, through which a thermometer passes to the interior, and which must always show a temperature of 60° Fah. By means of a Gay Lussac's densimeter he takes the specific gravity of the crude mixture. This done, the ether is poured into a bottle, and shaken up with some carbonate of potassa, which removes all the water, and leaves only a mixture of ether and alcohol, the specific gravity of which is again taken, and by means of an easy calculation the proportion of each of these liquids in the crude product is ascertained.

To simplify still further this method, the operator can employ the tables published by M. Adrian in the *Journal du Pharmacie et de Chimie*, and then no calculation will be required. It is indispensable that all the operations be made at a temperature of 60° Fah., a temperature adopted to regulate the densimeter, because the mixtures, being no longer the same before and after treatment with carbonate of potassa, the dilatation varies, and the tables of corrections made for the alcohol, the elements of the problem being threefold, are not the same as in the circumstances where we repeat them.

These operations are simple and easy, they only require care and a certain skill in manipulation.—*Le Moniteur de la Photographie.*

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

FROM these experiments, it appears to be quite certain :—

1. That the graphic action of light quickly attains a maximum within a certain time, varying with the strength of the light, and then gradually diminishes. To the point at which bromide and iodide of silver attain the faculty of blackening in the highest degree, I will give the name of the *photographic maximum*.

2. That iodide and bromide of silver are parallel in their behaviour towards light, that is to say, under otherwise similar conditions they increase and diminish in their photographic properties in the same intervals of time. From this we may with great probability draw the conclusion :—

3. That the photographic maximum of both is attained in the same time under otherwise similar circumstances.

That the graphic action increases rapidly, and diminishes much more slowly, is very fortunate for the practice of photography: for frequently, in taking objects illuminated with very different intensities, the lightest parts of the picture have already attained the maximum, when the darkest parts have only begun to act; and if, in this case,

*. Continued from p. 416.

the action did not continue, at least for a short time, nearly at the maximum, it would be almost impossible to reproduce the lights and shadows with truth.

With regard to chloride of silver, I have only made a few experiments. A strip of paper with chloride of silver was exposed to direct sunlight for intervals of 1, 1, 1, ½, ½, ¼ minute; the different portions acquired a violet colour in proportion to the length of exposure. In the developer, the colour at first increased in proportion to the time of illumination, but, by longer action, the portion exposed for ¼ minute became most intensely coloured. Several experiments of the same kind were made with a similar result; so that the phenomenon of solarization is ascertained to take place with chloride of silver also. But as chloride of silver does not acquire much colour in the developer, and both the violet colouration attained by it in the sun's light and the photographic sensitivity of the paper become important sources of disturbance with it, the phenomenon cannot be so well observed here as with bromide and iodide of silver.

It appears, however, that in this case also the maximum of graphic action is produced in nearly the same time as with iodide and bromide of silver. More accurate experiments, made with a more sensitive developer, and with the assistance of a good photometer, must furnish more precise results upon this point. The above experiments have, however, shown at least that the time in which the photographic maximum is attained depends upon the strength of the light, and I consider myself justified in asserting *that the product of the intensity of light and time in respect of the photographic maximum is unalterable* with regard to both iodide and bromide of silver (and probably, also, to chloride).

The phenomenon of solarization is of the greatest interest for the theory of photography. As I have already said, the chemical action of light upon bromide of silver requires several minutes before it becomes perceptible by iodized starch paper. But before this result is attained, the photographic maximum is exceeded. This is the most positive proof that the photochemical action is essentially different from the photographic.

I can give no explanation of the phenomenon of solarization. Schnauss thinks that by the long action of light an actual chemical decomposition of the iodide of silver is induced, and thus its property of attracting particles of silver is destroyed. I have, however, ascertained that there is no chemical decomposition of the iodide in this case. And even with the bromide this would be no explanation, but only a paraphrase of the fact.

If the proposition above enunciated by me be correct, a strip of paper with iodide or bromide of silver may serve at any time by a simple experiment to determine the chemical intensity of light.

(To be continued.)

THINGS YOU OUGHT TO KNOW.*

In writing this article we wish to offer a little bit of advice and information to the public at large. It is to relieve you, dear public, of a great deal of embarrassment when you are in a photograph-room, and to aid you in keeping on the good-natured side of your photographer, who, be he ever so amiable, will get vexed sometimes. And if there is a person alive who will feel grateful for any little exercise of charity you may display, it is your own photographer. No doubt you have a favourite one; so listen to a few words for your mutual good. When you make up your mind to have a lot of pictures made of yourself, your wife, and your babies, never expect an easy job of it. You may like your picture because it is for your friends, and you don't care, but your dear wife will not like her expression, and baby will have its thumb in its mouth, or both eyes looking straight (?) at its little pug nose, and both will have to sit over. Then, when all are pleased at last, rainy and cloudy weather, bad paper, stubborn chemicals, and a dozen other photographic vexations and mishaps that are really uncontrollable will occur to prevent you from getting your pictures as soon as promised. And although you have to run five or six times after them before you get them, don't mercilessly scold the employés for breaking their promises, and leave them with the idea that you think them ungentlemanly. Expect this, and be amiable under disappointments, and you will receive much better treatment. Employés in a picture establishment have much to try them, and are much abused by certain arrogant and ignorant persons, who seem to show the worst phase of their characters when in such a place. Some of them have an idea that everything is profit in the picture business; and although they may sit half a dozen times, they are not obliged to take a picture unless they are satisfied with it. This seems fair, but should they not have a little modesty and consideration for a man's time and materials?

There are several kinds of pictures. The daguerreotype is made on a polished silver surface; the ambrotype on glass; the melainotype on japanned iron; and the photograph on paper. Photographs are most in use, and our chief remarks will be about them.

Never expect to be taken immediately on entering a gallery. You must patiently await your turn, and in all well-regulated establishments you will be waited on in reasonable time. You are seated by the operator and a *negative* made, from which your pictures are printed. This is taken on glass, and what is light on the figure will be dark on the negative, and *vice versâ*. Unless accustomed to look at them, you cannot gain anything by wasting your time, the operator's, and the time of those waiting for you to get through, by asking to see the negative. Call next morning, and you will be shown a *proof*, or specimen print. That will give you a rough idea of how your pictures are going to look, although prepared with little care, and full of defects. When completed, there will be no comparison between proof and finished pictures. By the proof you can order either darker or lighter prints, and a good photographer will make them to look alike both in tone and shade. One part, however, cannot be changed without changing the whole picture. If the face is clear and distinct, the rest will be good.

A great many questions are asked about colours and positions. One day a lady brought at least a dozen samples of dry goods to the writer to know which would take best. She had all kinds, from calico up to silk, and not one of them pretty or good for picture-making. Purple, blue, pink, and white always take light. Black, brown, green, and orange take dark. Dark blue takes a pretty gray colour, and one of the prettiest photographs we have lately seen was of a green dress, with black and gold plaid stripe. Green and white plaid takes nicely, and light dresses, trimmed with braid, or children's dresses embroidered, are very nice.

Look perfectly at ease when sitting, and don't summon up all the vanity you have, and let it be seen in your picture. Let the operator place you in position, and then you can ask him to take you over if you don't like it. If you choose your own, you should not censure him for making you appear awkward. Don't expect a handsome picture when you are really homely, nor to look young when you are past forty. If the likeness is good, try to be pleased. Don't find fault with every trivial thing. We knew an old lady who had a re-sitting because a pincushion, dangling at her side, did not show, and another because one cap-string was over her shoulder. A third thought it made her look "too old," and insisted on having a daguerreotype ten years younger copied instead.

Such is life, in and out of a photograph gallery, and as our space will permit from time to time, we will give such further hints and incidents in point as will be instructive as well as interesting.

* From the *Philadelphia Photographer*.

ÆSTHETICS OF PHOTOGRAPHY.

BEING SHORT LESSON IN PHOTOGRAPHY, No. 26.*

PHOTOGRAPHS exist in two forms: portraits and views.

These may be reproductions either from nature or from prints.

Reproductions from prints, by photographic means, admit seldom of any amelioration; they are merely copies of the original, slightly deteriorated in general by the act of copying. In this branch, therefore, there is no scope for genius to develop itself, by which *beauty* can be eliminated out of crude materials, where, for want of harmony in the collocation, no beauty at present exists.

To copy from prints, engravings, and paintings cannot, consequently, make any claim to be classified as one of the fine arts, from the fact that the copy is simply a chemico-mechanical operation, differing from type printing only in the particulars of materials employed and in the manipulation.

A reproduction from nature, however, is subject to very different conditions, which admit of the application of all the resources of genius in order to produce or excite in the beholder of it the sensation of beauty. A knowledge of chemistry, even the most refined, or of all the minutiæ of photographic manipulations, assists in the production of a photograph just as much as an accurate steam-printing press does in the production of a proof-sheet, but no more; this knowledge will execute good results as regards the tone, permanency, and faultless condition of workmanship; but it cannot in any degree conduce to a happy combination of given materials so as to elicit out of an apparent chaos a *harmony* and a *beauty* simulating perfection in creation. More knowledge than the above is required, and something more than knowledge, something denominated *taste*, which may be defined as an innate or cultivated quick perception of the fitness of proportions and the arrangement of the individual parts that make up a whole, of the adaptation of light and shade, and of the harmonious arrangement of colours.

It is hence apparent that an artistical photograph can emanate only from the hands of a true artist, excepting by accident. This analysis of the subject accounts for the innumerable photographs, especially portraits, which by the friends of the parties represented are regarded as very faulty images of the owners. The operators were not artists, they were not gifted with the taste of appreciating beauty, nor educated in the principles that are the cause of this sensation.

It hence becomes our task, having carried our readers through numerous lessons referring to the chemistry of photography, as well as through the various mechanical manipulations involved in photographic operations, to take a higher view of the subject, to regard it in fact as in some measure allied to the fine arts, that is, music, painting, sculpture, &c., in which will be found parts purely mechanical or chemical that cannot be changed, and parts that admit of every change, being indeed the creations of the mind. This variety, or this creative part of photography, the part which is left for the taste of the artist to fill up, and which is the main-spring of success, is more a gift of nature than the result of education. We are inclined to recognize the existence of the gifts of nature as an axiom, as it were, in the constitution of man; and yet we cannot in any way account for the freaks of nature in the bestowal of those gifts; but, at the same time, we recognize another important axiom, so to say, that there is no achievement of difficulty that cannot be attained by education.

Thus two individuals may accomplish the same high purpose, may become transcendent as poets, musicians, or painters; one of these individuals is endowed by birth with the peculiar organization that caused the attainment of his success to be easy, and, as a simple consequence, like the flowing of a stream down a declivity, subject to the ordinary law of gravity. The other's success was the result of hard fagging, and resembles a constrained jet of water impelled through a tube over a mountain.

There are other differences than those of the efforts required in the performance of a given result. There is a marked difference in the time of the performance, and *always* a distinct difference between the work of a genius and that of a mere plodder; and this difference, as regards beauty and harmony of result, is in favour of the gifted child of nature.

Granting this conclusion to be correct, we still derive the satisfaction of knowing that, although not of that number strictly classified as endowed with great natural faculties for given spheres, men may so cultivate those faculties which they do possess as to polish off the defects of their organization and produce praiseworthy results.

Starting with this conclusion, we entertain the hope of being able so to analyze the conditions that produce beauty and agreeable sensations in pictures, that even those who have no special taste in this direction may derive important benefit, and learn both to appreciate them where they exist, and to imitate or excite them by a happy combination of results, where they ought to exist. In fine, it is our hope to turn operators into artists.

To attain our end, or to endeavour to do so, we will first enumerate the common defects both of portraits and views when taken by the camera, and commence with the portrait.

Portraits devoid of Taste.

Certain rules are recognized as to the size of the portrait: the full-length portrait, as its name implies, comprehends the whole figure; the three-fourths portrait, taken seated, exhibits the figure as far as just below the knees; the half portrait contains the complete trunk and exhibits the whole of the arms; the quarter portrait retains the head, shoulders, and arms as far as the elbow; whilst the bust is limited by the commencement of the shoulders and thorax. In vignettes the head and part of the neck alone are presented in the picture, or they may merge into the quarter portrait.

Of all these different forms, the full-length figure gives the greatest satisfaction, because it reproduces all that can be shown; next to this, it is our opinion, that the bust is most pleasing, because it presents to our view the complete features and neck without any parts apparently unfinished, from the fact that they are not commenced.

It is the aim of the artist that his portrait shall excite no desire in the beholder to see more of the party than that which is already depicted, but, on the contrary, to make him satisfied and gratified with what he sees.

If, now, the bust comprehends a part of the upper arm nearly as far as the elbow, the operator at once oversteps the rules of taste, because the portrait has the appearance as if a wrathy general had cut off all below with a sharpedged sword—there is apparently something wanting; we are not satisfied with the production; and we cannot always define the cause of this want of satisfaction. The defect is to be attributed to an excess of figure depicted or to the incompleteness of the parts commenced. Remove the stumps of the arms, or exhibit the complete upper extremities in order to remedy the unpleasantness of the effect.

For the same reasons the half portrait and three-quarter portrait excite sensations of dissatisfaction if the stumps of the thighs or legs are presented bisected in the middle.

Thus it is that the portraits between that of the full-length figure and of the bust are all more or less unpleasing, because they exhibit incomplete parts. To remedy such defects, or, at least, to aid in removing the unpleasant sensations that would arise, the artist tries to obscure such unfinished parts by throwing around them folds of drapery or by the adaptation of other accessories appropriate to the case.

The principal point, that is, the salient point for the

* From *Humphrey's Journal*.

operator to remember amongst the defects of portraiture just alluded to, is, when generalized, the want of completion in some part or limb commenced. The remedy is easily deduced from what has preceded.

Certain defects of photographic portraiture are to be attributed to the distortion produced by the lenses by which the negatives were taken. Even the best of lenses adapted for portraiture within-doors are subject to the defect of producing distortion more or less according to circumstances. For the opening of the lens must of necessity be capacious in order to perform the work of actinism in a reasonable time.

The nature of the defects here alluded to can be best understood by means of a diagram which any operator can easily construct for himself. Draw a circle four inches in diameter, and within this, and concentric with it, draw a smaller circle two inches in diameter. Draw a horizontal diameter and a vertical diameter, and mark their extremities on the outer circle with *North*, *South*, *East*, and *West*, and the extremities of the smaller diameters with the corresponding initials *N. S. E. W.*; and let *C* be the common centre of the two circles.

Suppose, furthermore, that the illuminated disc on the ground-glass of the camera is six inches in diameter. In addition, let us remind the reader in the first place, that the focus of the peripheral rays emanating from the same radiant is shorter than that of the central rays; and, secondly, that the picture of an object out of focus is larger than that of the same object in focus; and, thirdly, that the amount of increase in size depends upon the greater distance of the rays from the centre of the lens, or on the increase in spherical aberration; and fourthly, as before stated, that all photographic lenses at present made for in-door work produce more or less spherical aberration.

Satisfied with these facts, we proceed to show that those conditions in a lens must inevitably produce a certain amount of distortion in the photograph by increasing the magnitude of parts out of focus.

Thus, for instance, let the head of the model be focussed at the point *South*, or at the bottom of the ground glass, whilst the feet are focussed at the point *North*; the consequence of such a mode of adjusting the focus will produce a distortion in all the central parts, such as the middle and lower part of the trunk and the lower arm and hands; these will be out of focus and magnified beyond their proportionate size, and at the same time devoid of sharpness of outline and definition of tone in the print taken from such a negative. Now this distortion must exist under the circumstances enumerated, and it remains for us to devise means by which it can be diminished in amount,

There are two ways of accomplishing the end in view.

The first depends upon the well-known fact that, other things remaining the same or proportionate in the construction of lenses, the amount of distortion on a given space will diminish as the focal length increases, that is, a lens of eight inches focus will produce only half the distortion on the same space as that produced by a similarly constructed lens of four inches focus.

It is on this account that a long-focussed lens is invariably recommended in the production of full-length card pictures, the one-third and the one-half lenses being those generally used; and if the photographic gallery were sufficiently long and the light sufficiently intense, a two-thirds or four-fourth lens will produce still better effect, and in consequence would be used. This method of overcoming the distortion is preferable to the second mode, because it produces at the same time sharpness of definition over the whole picture.

The second method is one to which the operator must invariably resort with a given lens and a contracted gallery. It consists in dividing up the focus, as it is technically termed, or focussing midway between the centre of its lens and its periphery, that is, adjusting the parts of the figure that are found at *S* or *N* on the inner circle to accurate focus, or nearly so. By this expedient the head, extremities, and central parts will be slightly out of focus, but only half as much so as the central parts were when the focus was adjusted on the head and feet.

But because certain parts, and some of them very vital ones, are not accurately in focus, we must not expect to meet with extreme sharpness in the fine outlines or traits of the face, eyes, &c. In fine, by thus dividing up the focus, we lose in definition, as it were, one-half. It is frequently preferable to endure the maximum distortion in the central parts to the diminution of this distortion one-half at the sacrifice of definition in the face, which is the most important part of the figure. The distortion in question will gradually diminish in amount as the length of the figure decreases; in vignettes and busts, if the lens is the work of a respectable optician, there ought to be none apparent.

We shall resume this subject in our next lesson.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, August 31st, 1864.

Dr. Phipson has some interesting remarks in *Le Moniteur de la Photographie* on the presence of alumina in gelatine, which deteriorates the results in the processes of M. Poitevin, Swan, and others. He thinks the alumina is introduced into the gelatine in the following manner. When gelatine is prepared from tendons, bones, &c., a little alum is added to the solution with the view of precipitating the impurities. What these impurities are he does not know, but it is evident that by such treatment a certain quantity of alum must remain incorporated with the gelatine, and if the photographer finds its presence to be injurious, the practice alluded to must be avoided in the preparation of photographic gelatine.

To discover the presence of alum or alumina in a specimen of gelatine, place a morsel on a slip of platinum or silver and heat it over the flame of a good spirit lamp, until the whole of the organic matter being burnt, has disappeared. If any mineral matter remains the gelatine is not pure. To prove whether this residue contains alumina, heat it at the blowpipe after having moistened it with a drop of a solution of cobalt, it then exhibits a beautiful blue colour.

M. Kaiser remarks upon the effects of the vapour of benzine, and of ozone upon iodide of silver, said to be insensible to light. He says:—"Led by the remarkable discovery made by M. Poitevin, that tannin converts iodide of silver, which is insensible to light, into a very sensitive iodide, the idea occurred to me that there are many vapours or gaseous bodies which exercise the same influence upon iodide of silver. The employment of a gaseous body or vapour in lieu of a liquid has naturally many advantages in the preparation of dry plates, according to a method similar to that recommended by M. Poitevin, incited by his discovery. I have for some time occupied myself with the subject. The result of my experiments is, that the vapour of benzine changes insensible iodide of silver into a very sensitive iodide; and since it was my conviction that the ozone developed by contact of the vapour of benzine with atmospheric air, was in this case the exciting body, I have made some experiments in this direction with air ozonized by a galvanic induction apparatus, and I have found that the ozone acts like the vapour of benzine, but infinitely stronger. Thus ozone must be regarded as the active agent in all substances which possess the property of changing insensible iodide of silver into sensitive iodide.

M. Klein proposes some new methods of obtaining the bromides. For bromides of calcium he places in a capsule 30 to 40 parts of water, and 1 part phosphorus in fine powder; this is placed in a chimney with a good draught,

and 12·5 parts of bromine are added gradually. The combination takes place with the emission of light, but there is no danger. The capsule is gently heated until the liquid becomes clear, and the brown colour has disappeared, then a little brome water is added, until the light yellow tint becomes persistent; the liquid contains a mixture of phosphoric acid and hydrobromic acid, to which milk of lime is added until there is an alkaline reaction; filter, evaporate, and filter again, the excess of lime may be precipitated by a current of carbonic acid gas: but during evaporation, the carbonic acid in the atmosphere suffices. Again filter, and leave the liquid to crystallize; 200 grammes of bromine will thus yield 230 grammes of pure bromide of calcium. Bromide of potassium, (or of sodium,) is obtained by dissolving bromide of calcium and adding sulphate of potassa. After 12 hours' repose, filter: add to the liquid a solution of carbonate of potassa; so long as the solution continues thick, it must be filtered and evaporated to crystallization. The large crystals are free from sulphate of lime; but the mother waters, evaporated, yield bromide of potassium containing gypsum.

THE PATENT BLINDS.

SIR,—Since my stay in this part of the country, I have visited a large brewery, and find that louvre boards are not used, as you suppose, only for the purpose of ventilation, but also for the admission of light. If it was not so, breweries in confined situations would at certain times of the year be in almost total darkness. Hence I must dissent from your opinion, that my statement respecting louvre boards strengthens Mr. McLachlan's case.

I will not reply to his expressions, as to Mr. Webster's opinion, beyond saying that they are simply an insult to one of the most eminent men at the English bar, and that my experience of "counsel" is quite opposite to that of Mr. McLachlan.

I agree with you as to the inutility of his blinds, but think the proposal contained in his letter fair and reasonable.

If there be any merit in his so-called invention, I am sure photographers will at once acknowledge its worth when proved.—Yours very truly, W. WARWICK KING.

Nutshalling, near Southampton, 29th August, 1864.

PHOTOGRAPHY ON WHEELS.

SIR,—Will you grant me space to say a few words in reply to the "London Amateur's" letter in your last number?

I can assure him as impressively as the Duke did Mr. Huskisson, that there is "no mistake" in my adoption of the single wheel in my contrivance, which, for convenience sake, I will name the "Developing Barrow." My object was to secure the largest amount of convenience with the fewest drawbacks, and at present I think I have succeeded. Let me enumerate the advantages attendant on the "barrow" principle, and then consider those of the "truck system," for such I may term the "London Amateur's."

The single wheel, like the single man, I contend, can travel almost anywhere, smooth roads or rough, narrow or wide, *over fields or through woods; a sheep walk, even, is not too narrow;* all that is wanted is a little care to pick your way. The drawback is, that the arms have to bear about one-third of the weight, that is, instead of my perspiring under a load of 60 lbs., I do so under that of 20 lbs., with the advantage, however, that if I wish to rest, I can lay down *all my burden in a moment.* Now for the "truck system;" the "London Amateur" with his two wheels would fly along the level road and down the hills *perhaps even more quickly*, and, if a good coachman, half-way up the opposite one, before he would begin to feel the "bite of the collar"—delightful! Puss has left the poor tortoise far behind, or, in racing language, "nowhere." It is necessary, however, to secure that charming picture, to deviate from the "even tenor of his ways," and to go through that rugged lane, he attempts it, up goes one wheel, down goes the other; presently comes an upset and woful damage, just like the "*narrow gauge;*" this will not do, he must wait either for the tortoise or some chance assistance, when all must be taken to pieces and *carried* Fortunately, some one volunteers to get him over the rough road, and he again puts matters to rights and proceeds carefully on his route. He asks his way, and is told there are two routes, one some three miles round by what in the country is termed "pretty middlingish" roads, and another "through them grounds and that wood," which will save him more than half his journey. He determines to essay it, but supposing him to get over all the difficulties of irregular ground commonly met with in fields, once in the wood he is brought to anchor, where the tortoise at last finds him, perhaps, "cracking nuts and crying mother," like the babes in the wood. This is no overdrawn picture by any means, for he candidly admits that when he comes to rough ground, he takes the whole apparatus to pieces and has to carry the different parts, and how he could do that if at any time he was without assistance of some kind, I do not know—perhaps he will kindly tell me. With the single wheel all this might have been got over with one-half or less jolting, and quite independently of all foreign assistance. Moreover, he finds it necessary to carry the camera and lens generally; he must keep his hand continually on his store-box or partially unload. There is no compactness in appearance, tripod is strapped on the top, a gallon of water hangs to the tripod, and he must be ever on the watch to guard against an unlucky "spill." Finally, the barrow principle has the advantage, I think (for those who use small plates particularly), in being *cheap*—this would cost £2, as I said before—pray what is the price of a Rouch's Tent? to say nothing of the store box and wheels.

In what I have said, I am far from wishing to disparage the "London Amateur's" contrivance, but I still think my own will be found far more *generally* useful. If he could combine the two (no very difficult matter), he would have a most serviceable equipage, and one which many would gladly imitate if he would give them the opportunity.—I am, sir, your obliged servant, SOMERSET.

Thursday, August 25th, 1864.

MR. SWAN'S CARBON PROCESS.

SIR,—Will you have the goodness to afford me space in the next issue of the NEWS, for a few words of reply to Mr. Blair's letter, which appeared in a recent number.*

In commenting upon the merits of the process of carbon printing, which I published some time ago, through the medium of the Photographic Society, Mr. Blair falls into the error of supposing that that process is the sum and substance of my patent. Now, this is a mistake. The process which I described at the meeting of the Photographic Society certainly forms a part of my patent, but only a part. The patent will be fully specified during this month, and then it will be seen to comprehend various modifications of the process I described; and that, among others, I have not overlooked the modification now published by Mr. Blair. My specification describes a form of process almost identical in detail with Mr. Blair's, and absolutely so in the general mode of procedure.

But in proposing as a complete process the modification proposed, I think that Mr. Blair has overlooked the fact (as no reference is made to it), that unless the negative be reversed, or the print transferred, the print will be incorrect in position, and therefore comparatively useless.

For the guidance of those who may wish to try the process, allow me to say, that to meet this defect, I have provided that a transferred negative should be used to print from, or that the mounting of the paper, after exposure and before development, should be done with a cement that can afterwards be dissolved. India-rubber cement is of this nature, and one of its advantages is that the paper temporarily attached to the print by its means

* See page 399, on which appears a letter addressed by Mr. Blair to the *Photographic Notes*.

can generally be removed without the after use of any solvent, for it possesses so little tenacity (and yet sufficient for the purpose) that the paper cemented by it may be readily torn off without injury to the print.

I think the best mode of transferring a print so mounted, is, after it is dry to coat it, by means of a camel-hair brush, or by floating, with a solution of gelatine; then, after it has become quite dry, to trim it to the proper size, then to place it upon the card or paper mount, the mount being slightly damp, and pass the print and mount together, once, through a copper-plate printer's press.

As to the alleged disadvantages attending the use of collodion in carbon printing, no doubt, in certain cases, the use of collodion is objectionable, but certainly the disadvantages, named by Mr. Blair as attending its use, are not inevitable, for if the collodion film be of a proper character, and the mounting be well done, there is no danger whatever of the cracking of the collodion film in the act of drying the print; and then, after it is dry, it is quite easy to get rid of the collodion film altogether if it be thought desirable, as no doubt in some instances it will be.

I regret that Mr. Blair should have thought it necessary to depreciate the value of my process. It is perfectly easy to make the most meritorious invention that ever was vanish into thin air by the application of such criticism as Mr. Blair applies to mine. Mr. Blair says "It is a mere modification, &c.," "a simple variation in the manner of manipulating." Why, almost every invention may be characterised as "a mere modification," and certainly, some of the most useful are "simple variations in modes of manipulating, &c."

I believe I do not exaggerate the value of my improvements in carbon printing when I say, that they have advanced the art from a position in which it was practically valueless into one, now fully recognised, as of great practical value.

As to the patent, I will only say, as I have said before, that I have no wish nor intention to restrict the use of my processes for experimental purposes, and that I only desire to profit by them where they are made use of in a commercial way, and are a means of gain to others. In this case, it appears to me most reasonable that I should, to some extent, participate in the profit they are the means of obtaining for others.—I am, dear sir, very truly yours, Joseph W. Swan.

Photographic Notes and Queries.

You don't know what you can do till you try.

Sir,—The above apothegm was never more fully exemplified than in the following, which I send, thinking it may be interesting to some of your numerous readers.

On Friday last (unlucky day!) I had occasion to take a photographic view of a gentleman's residence, distanced about two miles from here. A friend, an amateur in the art, kindly offered his assistance. On our arrival at the gentleman's house an outbuilding was selected for a developing room, and my friend commenced unpacking; something fell to the ground. "Confound it!" exclaimed Mr. A, "it's the bottle of collodion!" Mr. A gathered up the fragments; "Hurrah!" he exclaimed, "it isn't all lost." Amidst innumerable bits of broken glass was about half an ounce of the precious liquid remaining at the bottom of the broken bottle, so he carefully laid a piece of paper over it to keep out the dust. I proposed returning for some more collodion, but was induced, reluctantly, just to please my friend, to try what he had saved. Now, owing to sundry preparations, such as making operating room perfectly dark, &c. &c., full three quarters of an hour elapsed before I was ready to coat the first plate, size 8½×7, which part of the process required great care to prevent bits of glass accompanying the collodion. I fully expected from the length of time it had been exposed to the atmosphere it would have rendered it useless, but the result was a most satisfactory picture. Another had to be taken from a different point of view, which turned out equally well; fully an hour and a half having elapsed from the breaking of the bottle to coating the last plate.

I remember in one of your recent numbers of the News an article showing how indebted professional photographers were to amateurs, so I send you this as one instance more.—I am, sir, yours respectfully, R. H. Dyball.

3, *Lower Notting Hill Terrace,*
August 24, 1864.

Talk in the Studio.

Photographic Letter Signature.—The *Scientific American* says—"The latest novelty in London and Paris is the Photograph Letter Signature. Note and letter sheets are now gotten up with miniature oval photographs of the persons using them affixed to the right hand lower corner of the last page, after the words 'Very truly yours,' which are printed in the usual place. They are getting to be quite as fashionable as the cartes de visites." We were not aware of the existence of such a rage. We have received during the last twelve months not less than three thousand letters from photographers, and we do not think that more than three have had such photographic appendages to the signature.

"Famous for Photography."—Our attention was arrested the other day in passing along the main street of a metropolitan suburb by an announcement in a hair-dresser's window, in which the word "Photography" was conspicuous. On reading it we found that it was an intimation that, "this thoroughfare being famous for the art of photography," especial attention was given at that establishment to dressing the hair, with especial view to the requirements of the photographic portraitist!

Photography in Schenectady.—George Augustus Sala, in one of his recent letters from America, gives an idea of the popularity of photography in American provincial towns. He is enumerating the general characteristics of the place, and these form part; "the 'Photographic Hall,' to judge from the frame in front of which every inhabitant of Shenectady had had his or her portrait taken half a dozen times, the 'Daguerrian Rooms,' a rival establishment, with a life-size photograph of the negro boy who carries about the operator's show-boards—young Sambo grinning hugely, as though in delight at being photographed for nothing."

Another New Process.—There is talk in select circles of another new photographic process which is to outstrip in results all that has ever been effected in photography. The pictures, we have heard described by a competent photographic judge as large and fine. It is alleged that none of the materials usually employed in photography are used in producing these pictures. At present, much secrecy is maintained about the process, but we understand that it will be the subject of a patent.

Caution to Photographers.—We have received the following, which may put our professional readers on their guard:—"On Tuesday afternoon, about 5 p.m., a young man of rather respectable appearance entered Mr. Tear's photographic studio, 6, Upper Dorset Place, Clapham Road, for the purpose (as was supposed), of having his carte taken. Having made all the preliminary arrangements, and the sensitive plate exposed, Mr. Tear was engaged in the dark chamber developing the picture, a short time, as is well known, about three minutes, when this *gentleman* decamped with the lens, passing through the waiting room and shop without exciting any suspicion. The man is about 5 ft. 8 in. in height, with brown hair and eyes, hair rather short, dressed in light trousers and vest, and dark brown Newmarket coat, a fancy tie, with gold ring (?), and soft "billy-cock" hat. On the lens is engraved "Ross, London, 10090." This worthy appears to have made a little over-calculation, for we are informed that Mr. Tear possesses an excellent negative, of which, doubtless, by this time, copies are being circulated among the police.

Photography and the Industrial Exhibition.—The Council of Administration of the Society for the Advancement of Industrial Art, announce that the *Palais d'Industrie* is placed at its disposal for organizing, in September or October, an exhibition of the progress of industrial art, including photography. Further particulars will be announced shortly.

To Correspondents.

Excelsior has accidentally mixed some of his acetate toning bath with a 60-grain nitrate bath, and wishes to know what to do with the mixture. A certain amount of the nitrate of silver will be precipitated as a chloride, and possibly some as an acetate; the gold will also be thrown down. Filter the solution, and use for sensitizing the paper as before, its strength will probably be very little impaired. The chief loss is that of the gold, which will be recovered eventually if the residues go to the refiner.

J. Macrow.—A photograph taken in Turkey by an alien will not be copyright in this country. To acquire a copyright in such a picture the proprietor

should be a British subject, who may then take the proper steps. It will be difficult for you to acquire a copyright in such a picture, inasmuch as if any one were to copy yours it would be difficult for you to prove that he had not copied an original procured in Turkey the same as yours. Copyright is secured by registering the copyright picture before any copies are sold, at Stationers' Hall. Our publisher will undertake the matter for you when you require anything registered.

DEVONIENSIS.—If you intensify before fixing, it should be done in the dark room. If after fixing, it may be done in daylight, but great care must be used, as the light always aids the ready decomposition of the silver and pyro-solution, and sometimes fogs the shadows. Negatives intensified in daylight, after fixing, have a rich brown non-actinic colour.

DRY PLATE.—You should follow the instructions given in the two articles on the subject *literally*. The specimens we have received from Captain Bonamy have not white skies, but a natural-looking delicate tint, quite clean and free from stains. With a little skilful manipulation, after the manner of Mr. Mudd, the effect of fine clouds might be easily obtained.

L. A. D.—The chief faults in your picture arise out of imperfect manipulation. No. 1 requires considerably more intensifying. The marks on the sky arise from irregular development, the solution not covering the plate in one steady wave. In order to obtain perfectly clean negatives on large plates, it is necessary to cover the film with the developer at once, without any interruption to the flow; any stoppage will leave a mark. Until you acquire skill to do this, use a very weak developer, say eight grains of the protosulphate and twenty drops of glacial acetic acid. The white stain at the top of your sky is apparently caused by accumulated drainings of silver solution. No. 2 is hopelessly fogged; probably the result of diffused light. As we recommended you last week, obtain a good bromo-iodized collodion, which will probably save you many troubles, developing more slowly, and giving you more control over your work. You will find it better to use hyposulphite instead of cyanide. The yellow stains in the prints and in the slips are the result of handling the prints before fixing with fingers which have touched hypo. The mode in which you mix and use the lime and gold is right. If you find purple reduced particles in the solution, they are probably reduced gold. The toning solution is apt to become decomposed, precipitating the gold if it be kept in the light.

NIL DESPERANDUM.—Your negative is under-exposed and over-intensified; the lighting is also too directly a top and front light. So far as we can judge, the chemicals are probably in good condition.

W. A. S.—It is very difficult to say which is the easiest varnish to use, as almost every photographer finds that easiest which he is most accustomed to. We should say that *per se* a varnish which can be applied cold, such as amber varnish, is easiest to use; nevertheless, we never experience the slightest difficulty with a spirit varnish. If there be specks of dust on the negative when the varnish is applied, almost any varnish will have a comet-like flaw in the film, but all dust should be carefully removed immediately before applying the varnish.

STEREO.—It would no doubt be possible to construct a stereoscope which would magnify very much more than is usually done, but of course defects in structure of the image, &c., would also be enlarged. The model-like effect of which you speak proceeds more from other causes than want of magnifying power. For instance, if the lenses are separated a considerable distance apart in taking the negatives, the effect of more relief is obtained, but at the expense of dwarfing the object. To illustrate, if you make a small model of St. Paul's and hold it in your hand; you see nearly all round it at one glance; but if you look at the actual building you only see a portion at a time, being just the amount included in the angle which the human eyes can embrace at once. But if you separate the lenses of the camera, or, in other words, separate your eyes a yard or two apart; you will see so much more both of the right side and the left, and in just such proportion diminish the appearance of magnitude. If a view be taken with the lenses separated about three inches, and the stereoscope be fitted with lenses of exactly the same focal length as those with which the negative was taken, the illusion as to size ought to be almost perfect, and the effect very similar in the stereoscope to that of the actual scene. The most perfect of this kind we have seen is produced by a stereoscope invented by Mr. Sutton some years ago, and manufactured by Cox; it is a combination of the reflecting and refracting stereoscope, and the effect it gives is very beautiful.

CALCIUM.—The amount of light admitted in your proposed plan we should think would be sufficient, and the general plan satisfactory if you could get a little more height. We fear that you will find it very inconvenient, if not impossible, to work standing figures with only seven feet. With one or two feet more in height, and, if possible, in width, the result would be good.

A SUFFERER.—We have heard many complaints lately of the metallic spots in *Rive* paper. They are in the paper, and not the result of careless albumenizing. *Saxe* papers are generally more free from this defect, but lately they have not been entirely free. We regret to say that the frequent complaints of bad paper appear to us the legitimate result of a cause which has been for some time in operation. There has been a downward tendency in the price of photographic productions, this has produced a demand for cheap albumenized paper, which has possibly been supplied by some houses by diminishing their own profits, and underselling the trade generally. Other dealers not to be outdone in low price, but unwilling to sell without sufficient profit, seek for a lower-priced paper to albumenize, and so the matter proceeds, the rage for cheapness producing a sure and gradual declension in quality, until such a thing as a thoroughly good paper is hardly obtainable at any price.

N. JOCELYN.—We have posted the letter.

NEGATIVE.—In using kaolin it is necessary to add a little to the discoloured solution, shake it up, and then filter. Adding a few drops of a solution of common salt, and filtering, will also clear a discoloured bath.

W. T. D.—In order to secure the copyright of a picture, it is necessary to register it before any copies are sold. To register a photograph you must procure from the Registrar's office a blank form to be filled up, describing the picture. This form must then be deposited at the office and the fees paid. The forms are sold at one penny each. If you send stamps to our publisher he will send you some forms, which, after filling up, you can send back to him with 1s. 3d. for each picture, and he will manage the registration for you, as the fees must be paid by some one in person, the officer declining to receive postal communications.

OCEOLA.—We regret that we cannot aid you in getting a cheaper studio than that we described as recently erected by Mr. Fitch. Perhaps your village carpenter may be able to build a similar one from the description a little cheaper.

W. H. H.—Your negatives are slightly under-exposed and over-intensified. This makes the prints hard and flat, and destroys modelling in the face, which of course shows a result of this kind much more readily than silken drapery.

H. PRIOR.—The mottled stain on your background appears to arise from the developer being repelled by the film on its first application, and running into branch-like lines as if the plate were greasy. The remedy is, if the bath be somewhat old, to add a little more alcohol to the developer, and be careful in manipulation. Sometimes it arises from the condition of the collodion, and the addition of a drop or two of distilled water to an ounce of the solution will prove a remedy. Paper portraits were taken by the calotype process long before the year 1851. During that year, a few collodion negatives were taken in the Great Exhibition by Mr. Archer, Captain Scott, and possibly by others. Mr. Mayall was at that time a daguerreotypist, and had not, so far as we know, taken paper portraits at all. He was one of the earliest professional photographers to take up the collodion process. The small extra lens, in Jamin's portrait combination, is to shorten the focus when quick action and small pictures are required.

N.—Your experience is another illustration of the discrepancy of evidence which often puzzles the photographic investigator. The print you enclose is very unsatisfactory indeed, the reduction in depth giving a washed-out feeble effect. On the other hand, we received a few days before a print of excellent tone and quality, sent to illustrate the value of the reducing process. 2. Our attention has been chiefly called recently to the apparently inexplicable cause of pinholes occurring at home, which commence during a day when all has gone well up to a certain point, and then suddenly pinholes appear. The cause named is an important one, and we will call attention to it. 3. We think we understand your description of the means of tilting the large dish. The under frame is, we presume, cut away at the corner to permit the depression of the dish. Thanks. Your second and more fully explanatory letter has just arrived as we go to press.

FREDERICK BRETON.—Your three-inch power appears to answer every purpose, and the results are equal, if not superior, to any we have seen. The definition is excellent, and the work altogether remarkably clean and brilliant. Thanks for the description of your method and for the very interesting reproductions. We shall always be glad to hear from you.

'Mr. SWAN'S Carbon Patent," "Cheap Electricity," and several other communications are compelled to stand over.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. JABEZ HUGHES, Ryde, Isle of Wight,
Photograph of H.R.H. the Princess of Wales.
Photograph of H.R.H. Prince William of Prussia.

MR. JOHN STUART, 120, Buchanan Street, Glasgow,
Two Photographs of the Rev. Malcolm Macgregor.
Two Photographs of the Rev. Dr. Lorimer.

MR. CHARLES SANDS, 13, St. James's Street, Brighton.
Photograph of the Bedford Hotel, Brighton.

MR. THOMAS WORDEN, Newcastle-on Tyne,
Photograph of Newburn Church, near Newcastle.
Photograph of Newburn Village, near Newcastle.
Photograph of Ryton Village, near Newcastle.
Photograph of Ryton Church, near Newcastle.

MR. GEORGE HODSON, 103, Devonshire Street, Sheffield,
Two Photographs of the Rev. Henry Quick.

MR. J. H. KAY, 57, Argyle Street, Glasgow,
Two Photographs of the Rev. David Johnstone.

MESSRS. APPLETON & Co., Bradford,
Three Photographs of the Rev. W. M. Punshon, M.A.
Four Photographs of the Rev. John Scott.
Two Photographs of the Rev. W. L. Thornton, M.A.
One Photograph of the Rev. Gervase Smith.
One Photograph of the Rev. S. D. Waddy, D.D.
One Photograph of the Rev. L. Wiseman.
One Photograph of the Rev. F. A. West.
One Photograph of the Rev. P. McOwan.
Two Photographs of the Rev. Charles Prest.
Two Photographs of the Rev. Thomas Jackson.
One Photograph of the Rev. W. Arthur.
Two Photographs of the Rev. George Osborne.
One Photograph of the Rev. John Rattenbury.
One Photograph, Group of the Revs. Dr. Waddy, F. A. West and Charles Prest.

MR. THOMAS TYLEY, 28, Trinity Street, Bristol,
Photograph of Longleate, residence of the Marquis of Bath.
Photograph of The Elms, Cotham, Bristol, residence of J. Davis, Esq.
Photograph of the Painting at Longleate, of the deprived Bishop Ken.
Photograph of the Painting at the Palace, Wells, of the deprived Bishop Ken.

MR. A. S. WATSON, Great Yarmouth,
Photograph of Major-General Sir Thomas Seaton, K.C.B., Jun.
Photograph of Thomas Rant, Esq.

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THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 314.—*September 9, 1864.*

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MR. SWAN'S SPECIFICATION.

THE details of Mr. Swan's process with the latest modifications, and the points claimed in the patent are now before the public. The specification does not contain much, that has not already from time to time during the last few months been brought before our readers. The chief question of importance, perhaps, to photographers which the specification answers, refers to the points claimed in the patent. In the specification before us, Mr. Swan thus sums up his claims:—

First, the preparation and use of coloured gelatinous tissues in the manner and for the purpose above described.

Secondly, the mounting of undeveloped prints obtained by the use of coloured gelatinous tissues, in the manner and for the purpose above described.

Thirdly, the remounting or transference of developed prints produced, as above described, from a contemporary to a permanent support.

It will be seen from the statement, that Mr. Swan restricts his claims to the *method or methods of working* described in his specification: let us then briefly recapitulate the methods in question.

The first claim is for the invention of tissues, which shall render the process of printing from the back and developing from the front simple and easy. This method of printing, we need scarcely repeat here, is the only practicable mode of securing half-tone in carbon prints. The principle upon which it is based, as our readers know, had been published some years previously. As a good deal of misapprehension on this subject seems to prevail amongst our contemporaries, we may just pause here, to indicate once more the details of this discovery which is a most important one in the history of carbon printing. In November 1858, in a communication to the *Journal of the Photographic Society*, Mr. Burnett very clearly pointed out, that in order to obtain half-tone in carbon prints, the unprepared side of the paper should be placed in contact with the negative, in order that the opposite surface not acted upon might be washed away first. In January, 1859, Mr. Blair published in the *Photographic Notes* the same idea, having arrived at it in all probability independently. In November, 1860, M. Fargier described to the French Photographic Society his method of putting this principle into practice, by coating the film of sensitive gelatine and pigment after exposure with collodion, removing the whole from the glass, and then developing. We believe M. Fargier claimed the discovery of the principle as well as the method of applying it. M. Poitevin, who originally patented the carbon process with gelatine and bichromate, in 1855, however, denies all claim of originality to M. Fargier, either as regards the principle or mode of applying it. He accredits the first publication of the principle to the Abbé Laborde, in July, 1858; but states that he had discovered it for himself at an earlier date. If M. Poitevin be correct, to the Abbé Laborde belongs the credit of the first publication; we have not the means at hand of verifying his claim, and in any case, we have no hesitation in stating that Mr. Burnett first published the idea in this country. It should be added, also, in regard to M. Fargier's claim, that M. Poitevin had used collodion for an analogous purpose in his process with perchloride of iron, some months prior to M. Fargier.

We may remark in passing, that some of the gentlemen who have been disposed to disallow Mr. Swan's claims, have upheld those of M. Fargier. Now it should be remembered that his process was at best but a method of putting into practice a principle already recognized; nevertheless, he made his process the subject of a patent. In Mr. Swan's process, or processes, we have several methods decidedly novel and effective, which until some method of rewarding inventors be adopted, we think he has a perfect right to patent.

To return to the methods in question: the modes of preparing the tissue are fully described in the specification: they consist in forming sheets of gelatine and colouring matter, which may be lampblack, indian ink, or other pigments. If the sheets are for immediate use, the plan described by Mr. Swan in his first paper is adopted, namely, the bichromate is added at the time, and collodion is used as a support. If the tissue be required to keep, it is prepared without any bichromate, and may be excited in the same manner as albumenized paper, by floating on a solution of bichromate. This is then treated in the same way as the tissue with collodion, already described in our pages.

The second claim is for the method of mounting undeveloped prints, obtained with the tissues described. The modes of mounting consist in the use of india-rubber solution, if the print have to be transferred; or of albumen to be subsequently coagulated, if the print have to remain on the paper. How far these methods of mounting can properly be included within the patent we are uncertain. If they can, then the patent could be made to include a modification of Fargier' method, just proposed by Mr. Tunny, in which he uses albumenized paper, instead of the film of collodion applied by Fargier. We are more doubtful of the soundness of this clause than of the first.

The third claim is for the method of transferring carbon prints from the paper which supported them during development, on to another paper, so as to avoid a reversed image. We are uncertain of the soundness of this claim. Carbon pictures have been transferred before. Mr. Pouney transfers his. It is true that it is the "transference of developed prints produced as above described," which is claimed; but this being so, the method itself being protected, it becomes unimportant whether the transference of prints produced by it is protected or not.

The point upon which we believe Mr. Swan to possess a

legitimate claim, and which is really the most important one, is the preparation of the tissue of pigment and gelatine, either on collodion or paper, sensitive or non-sensitive, so that it can be printed on one side and developed upon the other. This is a broad and well defined claim, which can, we think, be easily sustained. We do not know that any one else pretends to have made such a tissue, or even thought of it; and it is upon the use of such a tissue that the whole question of practicability is based.

Admitting the legitimacy of the claim to be established, the next point of importance to photographers relates to the terms upon which they will be permitted to use the patented process. Upon this point, we have no official announcement to make, but we may state that we have reason to believe that the terms will be lighter even than was first contemplated. It will be remembered that Mr. Swan contemplated the charge of a small premium, and a royalty of something like a farthing a picture upon all work produced by a professional photographer by his method. We have reason to believe that he does not now intend to charge either premium or royalty; but simply to reserve to himself the manufacture of the tissue, and allow the purchase of it to carry with it the right to use it without any payment for licence. We do not, as we have said, put this forward as Mr. Swan's official announcement; but we know that such a scheme, possibly modified by certain conditions, is in contemplation. If it be carried out, we think its liberality must commend itself to every photographer, and silence all cavilling as to the patent; and, moreover, we think it is probable that Mr. Swan will in that way secure his most certain remuneration. Few persons would trouble to manufacture the paper prepared with pigment and gelatine, with all the risks of failure, when it could be purchased ready for use, as easily as albumenized paper, and a large demand at a fairly remunerative price, might probably be hoped for.

We have one or two remarks and suggestions on the manipulation to add. In preparing the paper, Mr. Swan finds it unnecessary to give the paper any preliminary coating of dextrine, starch, &c., to ensure the gelatine readily leaving it prior to development. The only point to observe here, is, that the film of gelatine is sufficiently thick, and that the exposure is not too much prolonged. If the film be thin, or the exposure too long, the light would penetrate right through in some parts, and producing insolubility, would cause these parts to adhere to the paper, instead of readily coming away and permitting development.

A ten or twelve grain solution of bichromate of potash is sufficiently strong to render the paper sensitive. It should be floated in the same way as albumenized paper, but instead of remaining on the solution a few minutes, should not remain longer than as many seconds: it should, indeed, be simply placed on the solution, and lifted away at once.

After exposure, which for the present must be governed by judgment, as in camera exposures, and not by sight, the 6-grain india-rubber solution will still be found the best material for mounting proofs intended for transfer. Mr. Swan prefers giving the gelatine a coat of collodion after exposure, and before mounting; but this is not necessary, Col. Barratti, the accomplished Editor of *Il Camera Oscura*, who recently called upon us, showed us some very fine carbon prints he had executed by Mr. Swan's process, and stated that he had found that if the tissue after mounting with the india-rubber solution had a slight coating of it run round the edge so as to make certain no water go under the edges in developing, no danger existed of the tissue leaving the paper during development. If the print be not intended for transfer, there is no reason why it should not be mounted with albumen, which appears to answer perfectly.

In transferring, Mr. Swan has found the following method answer best: after the finished print is dry, he coats it with a solution of gelatine, and suffers this to dry, after which the picture is cut to shape; he then takes a piece of moistened paper or card, and places it on the print, and submits the whole to heavy pressure, with a piece of felt or other elastic substance over it, so as to secure the perfect contact in mounting of the most depressed part of the image. We have found in practice, that if a piece of albumenized paper be applied to the finished print whilst it is still wet, and the gelatine image still slightly sticky, and a slight even pressure applied, perfect and satisfactory mounting was secured; but this plan is open to the theoretical objection that there is danger of blurring the finest lines by mounting, and applying pressure to them whilst moist and soft. The same objection applies in the Fargier system of manipulation.

We remark in concluding that there is no mention in Mr. Swan's specification of the application of his process to produce photographic enamels; that field, therefore, remains open for experiment and possible profit.

RECTIFYING A NITRATE BATH.

It frequently happens in the history of photography that facts have to be received before explanations are ready, and all attempts to dogmatize on theory are put to silence by the uncontrovertible evidence of facts. Some three or four years ago, a clever provincial professional photographer, whose name at present escapes our memory, forwarded to us a short communication on an infallible method of rectifying a nitrate bath, the application of the remedy having, in his hands, been followed by unvarying success. This remedy consisted in adding to his nitrate bath about a teaspoonful of the fresh cyanide solution intended for fixing negatives. This threw down a precipitate, which was removed by filtration, and the solution was at once restored to perfect working order.

We published the suggestion at the time, but added the comment which appeared to us to be necessary. It seemed to us that the remedy was analogous in its operation to carbonate of soda; that the cyanide decomposed a certain portion of nitrate of silver, throwing down insoluble cyanide of silver, and leaving in solution a certain proportion of nitrate of potash. The formation of an insoluble precipitate of cyanide of silver, we remarked, like a precipitate of carbonate of silver, probably carried down with it some other impurities, and thus improved the condition of the bath. This appeared to be legitimate explanation of the matter, having regard to the known reactions taking place. It is somewhat singular, however, that since that time we have, on several occasions, received information from very able photographers of the efficiency of this method of rectification after all others had failed.

We have just received an account of the treatment of a bath in this way, by Mr. Valentine Blanchard, which will interest our readers. The quantity of solution operated upon was about eighty ounces, consisting partly of an old bath and partly of new solution, the whole, at the commencement of this short history, working well. Having been placed in a new built-up bath of wood lined with india-rubber, after a short time traces of fog began to appear on the plates excited in it, and it was noticed to have a slight odour of the india-rubber, or of the india-rubber cement with which the lining was joined. It was then turned into a half-gallon bottle, treated with carbonate of soda, placed in the sun, and subsequently filtered in the usual approved manner. On trying a plate, it was now found to work well; but the persistent odour of india-rubber remaining gave indication of the presence in the solution of something which would probably quickly derange it again, and which would be, therefore, better away. The solution was therefore poured into a flat dish and placed for a few hours into a hot oven until it was evaporated to something less than half its bulk. It was now found to be quite black and turbid, retaining its black colour even after dilution and filtration. It was therefore again treated with carbonate of soda and placed in the sun. Instead, however, of throwing down a blackened deposit as usual, and becoming clear, it remained persistently black,

filtration still failing to clear it. A portion of it was now taken, and a very small quantity of ammonia added, but after two days' exposure to sunshine it still remained obstinately black. Two portions of it were now taken from the bulk for experiment: to one pipeclay was added, and the solution was placed in the sun; this cleared it a little, but not perfectly. To the other portion a little of a solution of cyanide of potassium was added; this produced an immediate effect; the turbidity at once began to subside, and after filtration the solution became perfectly clear and bright. The whole quantity was now treated in like manner and with like success; and after the addition of a little nitric acid, was found to work perfectly.

There is another point, however, to mention. The condition of the bath was not the same as before it had received this treatment; but in many respects superior. It now gave negatives which, without any intensification whatever, were full of vigour. Any degree of intensity was easily produced by the continued action of the first applied iron solution; the shadows were also remarkably clean, and the gradation excellent. We have examined some of the negatives so produced, and find them rich in colour, round, delicate, and brilliant, in all respects the best class of printing negatives.

THE TANNIN PROCESS.

SENSITIVENESS, BLURRING, KEEPING, STAINS, &c.

OUR recent notice of a modification of the Fothergill process, and the excellent pictures produced by it, has brought us several communications from correspondents, some of whom state that they have continued steadily to use the Fothergill process, and from others who have continued to use the collodio-albumen process, for years past with constant success. It has also brought us several letters claiming for the tannin process a greater degree of simplicity and certainty than any other. It is no part of our duty to assume anything like partizanship for any process, but to duly describe the respective merits of all. We regard the tannin process as being decidedly the most simple of the dry processes, and, in many respects, the best. If we at any time give especial attention to its real or alleged defects, it is simply with a view to the discovery of the cause that, by its removal, a perfect process may be attained.

Mr. Jabez Hughes has recently favoured us with some exceedingly fine illustrations of the tannin process: clean, brilliant, delicate, and soft—good in all respects. With the ordinary acid development, he states he can generally make quite certain of his picture with an exposure of about six times as long as for wet collodion; and with alkaline development he can secure it with an exposure twice as long as wet collodion. This is an amount of rapidity not joined with certainty in other dry processes. We have also, as we have before stated, received from Mr. Sutton prints in every way satisfactory, which, he informs us, are from tannin negatives, which have received exposures little exceeding wet plates.

The one draw-back of blurring which occurs in some hands, very singularly, never troubles others at all. Mr. Hughes assures us he has never seen a trace of such a thing in his negatives, and we have similar testimony from others. On the other hand, there is, we think, undoubted evidence that it does occur with some persons in the tannin process, and not in other processes. Mr. Sutton and Major Russell believe it to be due to an optical cause, reflection from the back of the plate. Major Russell assures us that all his experiments tend to convince him that this is the true cause. In a private letter on the subject, he informs us that in a recent experiment to test the transparency of sensitive plates to actinic light, six portions of a plate previously partially cut with a diamond, were all treated differently after coating and exciting, and then placed over sensitive paper, and submitted to the action of sun; these all transmitted sufficient light to colour the paper a deep brown in five minutes, and a cedar colour in one minute. This is tolerably satisfactory proof that the alleged opacity of sensitive media to actinic light is not borne out by experiment. So far so good. We only seek truth, and readily give these facts. Major Russell states that this blurring is effectually removed by using a plate of orange glass; this, of course, is only available for experiment: but he also suggests that a similar remedy to that suggested by Mr. Marlow some years ago, and to which we referred a few weeks ago, namely painting the back of the glass, will also remove the evil. If this be efficient, although troublesome, it may be worth the trouble. There is, however, still against this optical theory, the fact that this blurring occurs with some persons in the tannin process, and not with plates prepared by other processes, which give films equally translucent. The case to which we recently referred, in which Captain Bonamy informed us, that he always lost certain fine cordage in a given view with tannin plates, which was rendered perfectly by Fothergill plates, is to the point; in the illustrative print before us, the cordage in question is as nearly as possible in the exact centre of the plate, not being a quarter of an inch out, a fact strongly militating against the reflective theory. The statement made at a recent meeting of the Photographic Society of Marseilles, that several members found it difficult to secure the delicate lines of engravings when copying them on tannin plates, also tends to corroborate our theory of a tendency to lateral deposit, blurring or swallowing up fine lines, arising out of certain peculiarities of chemical conditions. We shall be glad of evidence which tends to prove beyond dispute either theory.

On the subject of keeping tannin plates, in reference to which we recently published some remarks by a correspondent, Major Russell makes the following interesting remarks:—

"One of your correspondents, in the last NEWS, complains that tannin plates will not keep. I have not made many trials of their keeping qualities, but have kept the plates for some months in summer without perceiving any deterioration. A friend recently exposed two plates which I had prepared two years before, and was successful with both: one made a very good negative. On some other points your correspondent's experience differs from mine. I think that it is a great mistake to leave the slightest trace of nitrate of silver in the film; I have tried it very carefully, but could not find that sensitiveness was thereby increased in the slightest degree. A solution of soluble iodide, 1 or 2 grains to the ounce, poured over the film, will so effectually destroy its sensitiveness that no ordinary amount of washing will restore it. I could never find that salt or bromide diminished sensitiveness at all, if sufficiently washed out again; the latter is, I think, the better. I have used 30 grains to the ounce without bad effect, and now always dip the plates in a 2-grain solution of bromide of potassium after three distilled waters, and sometimes dissolve a small trace in the liquid with which the films are moistened before development. Too large a quantity of soluble bromide will, doubtless, greatly diminish sensitiveness, but, unless I am greatly mistaken, a film which contains bromide of silver will not produce a bright image without a trace of the soluble salt; this is much more difficult to remove entirely by the nitrate bath and washing, than is generally supposed. Tannin plates, prepared as I have described, can be made many times more sensitive than those which I can produce by any other dry process. The transparent spots are, I believe, caused by something left on the plate in cleaning it. I was never troubled with them, except for a short time, when I cleaned the glasses with collodion containing deliquescent salts. This soon dirtied the rubbers so much that the plates looked as if greasy, and the spots appeared in great force; I do not know whether they increased with time, but after the plates had been kept only a few days some of them were half an inch in diameter. The rubbers were well washed, and a mixture of benzole, alcohol, iodine, and tripoli used to clean with, and I have not seen one of the spots since.

Films prepared with tannin appear to be more permeable than those by some other dry processes; this is, probably, the reason that the spots are more frequently seen on the former."

Two correspondents have recently complained of difficulties in the process; the first complains that his preliminary coating of gelatine ran greasily in streams off the plate, instead of giving an even coating; the second, that he was troubled with irregular wave-like lines at the edges of his plates, suggestive of irregular drying. On these two difficulties Major Russell remarks:—

"I will gladly do my best to assist your correspondents; first, A.A. I have no doubt the glass repels the gelatine in the same way as a greasy plate, from the same reason, because it is greasy. Most likely the rubbers or cloth used to finish with have been touched by greasy hands, or at any rate are not clean. I never knew a clean glass to repel any watery liquid. I know nothing of diamond polish. The cleaning liquid which I now use is the best with which I am acquainted; it is made by mixing about 1 part benzole with 7 parts common alcohol (not methylated, as this emits too pungent an odour), iodine and tripoli. This may be polished off whilst still wet; but should be thoroughly dry before applying the gelatine. To prevent the red fog, I would recommend mixing a few drops of acetic or formic acid to the pyro, besides using the acid silver solution; if this does not succeed, and the bath is not very impure, the fog is probably produced by the soluble salts of the collodion being too completely removed. Remedy: do not keep the plates in the bath long enough to convert all the bromide; do not wash the plates quite so long, and, if necessary (to obtain sufficient brightness), dissolve one-thirtieth of a grain or so of bromide of potassium in each ounce of the liquid used to moisten before development. More bromide than necessary will make the image unnecessarily bright and diminish sensitiveness.

"Disheartened."—I have never seen the streaks so strongly marked, but have occasionally been troubled in the same way in a less degree. In my case the fault was caused by the imperfect mixture of two liquids of different properties on the film when set up to dry. It is rather difficult to determine the cause precisely without knowing how the plates were prepared. If the tannin was washed off, most likely this was done very imperfectly; or if washed in very hard water, and finished with distilled, an imperfect mixture of the two might produce the effect. To economise the distilled water without producing streaks, the last portion might be waved about the surface of the film for a few minutes, or poured on and off a few times. If the tannin was not washed off, the same remedy will probably answer. Pour on and off oftener, and let it remain longer on the film.

"Some time back you wrote to me about markings in the sky. I have since once met with what I believe to be the fault referred to. Being in a hurry, I did not leave the tannin on the plate so long as usual; the consequence was, that it did not penetrate the thicker parts of the collodion; these places were very visible before development by *transmitted light* as marks of greater opacity. The tannin was dried on.—In haste, yours faithfully," C. RUSSELL.

REFUSING TO PAY FOR PHOTOGRAPHS.

A CASE of some little interest to photographers was decided in the Sheriff's Court last week, involving the question as to the right of a customer demanding a return of his money, or refusing to pay for photographs executed for him, on the ground of their being unsatisfactory. We give the report as it appeared in some of the daily papers, merely correcting some errors of date and name:—

At the Sheriff's Court, on Thursday morning, before F. Gibbons, Esq., a Mr. Warren brought an action against Mr. A. L. Henderson, a photographer, to recover 10s. 6d. damages, alleged to have been sustained in consequence of defendant not taking a dozen correct full-length photographic portraits of the plaintiff.

Plaintiff, upon being sworn, stated his grievance, and at once produced the portraits.

His Honour.—Let me see them.

They were handed up, and his honour looked alternately from them to the plaintiff, remarking at last, "Why, really, Mr. Warren, I do not see how you can complain. I think they are exceedingly well done. In fact, if anything, the defendant has made you too good looking." Upon this, the plaintiff, to the astonishment of every one in court, quickly left the witness box, leaped over the barrier in front of the clerk's desk, and jumped on to a chair.

His Honour looked considerably surprised at this, but he was still more startled to see the plaintiff draw himself up straightly, and holding his arms tightly by his side, ask, "There, your honour, do you see anything amiss in my legs?" (Roars of laughter.)

His Honour (laughing).—I do not see anything the matter with the portrait; perhaps Mr. Buchanan will look at it.

Mr. Buchanan thought it was a very good portrait.

Plaintiff.—But the legs—the legs—that is what I complain about.

Mr. Buchanan.—Perhaps while you were being taken you drew your coat over your legs in some way.

Plaintiff.—My legs are all right, but he has made one shorter than the other (laughter). I showed the portrait to a lady, and she did not approve of it at all.

His Honour really did not see any just ground for this action. In fact, the plaintiff had not even a leg to stand on (laughter). The photographs were exceedingly well done, and the plaintiff must be nonsuited.

Defendant asked for costs, which were allowed.

We have before us one of the prints in question. We have no means of judging how far the worthy Sheriff was right in stating that the likeness was a flattering one, but we have no hesitation in saying that the photographs were too cheap at the money, being of more than average general excellence, and of exceedingly fine tone. The alleged shortness of one leg is the natural and necessary result of the other leg being slightly in advance of it. We fear there is no remedy but patience for that ignorance on the part of sitters which ignores the simplest laws of drawing and perspective; but it is fortunate that, as in the case just decided, a just legal decision may prevent the photographer from being mulct as well as mortified.

PHOTOGRAPHY UPON PAINTER'S CANVAS.

BY A. LIEBERT.

MR. WALDACK'S process (described in PHOTOGRAPHIC NEWS, No. 301, p. 283), for taking enlarged positives on artist's canvas, requires the employment of *iodide* of silver, the manipulation with which, as in iodized positive paper, is very troublesome. I can understand that recourse would be had to preparations of this nature, in spite of the difficulties and chances of failure encountered at every step, when for enlarging photographic pictures there were at hand only instruments necessitating a very long exposure: now that enlarging apparatus is much better constructed, we are able to obtain pictures upon albumen-chloride paper very rapidly, and consequently this branch of photography is every day further developed. It may, perhaps, not be uninteresting to your readers to learn of an easy process for obtaining enlarged positive pictures upon canvas by means of *chloride of silver*, which renders the process as simple as that daily employed in printing with the pressure frame. This process, which I employed advantageously in America, during six years, is described in my forthcoming treatise on practical photography, from which the following account is extracted.

The canvas primed with white lead is well strained on its frame, and first washed with strong alcohol, which is applied all over with a soft brush for several minutes: it is then left to dry in the *shade;* it is afterwards gone over with a soft brush dipped in the following solution:—

Water ...	...	...	...	...	50 parts
Bicarbonate of soda	...	...	...	5	„

until the canvas assumes a uniform white tint; it is then placed in a sloping position, and washed with water poured from the rose of a watering-pot, and again left to dry in the shade. Thus prepared, the canvas will be ready to receive the solution of salt and nitrate of silver, as with positive paper.

The salting solution is composed of—

Water	500 parts
Hydrochlorate of ammonia in powder	10 „
White gelatine	1 part.

The gelatine must be of the best quality; it is first dissolved in a small quantity of warm water, then added to the solution of salt, which must also be slightly warmed, especially in winter.

In many cases we may employ the solution of salt without the addition of organic matters, which are added only to form a vehicle capable of producing more relief and sharpness, with which we can dispense, as the canvas is soon covered with paint, and it is only the sketch that we require.

This bath will be applied like the preceding solutions, with a soft pencil, taking good care to produce a uniform coating, so that an equal impression of the pictures be obtained.

When the salt coating is dry, the sensitizing will be performed in the dark room, as with paper simply salted, with a solution of ammonio-nitrate of silver, also applied with a soft pencil, or with a tuft of cotton reserved especially for this purpose. The canvas is then exposed in the solar camera, as in taking a picture on paper, and the printing is stopped when the picture has nearly attained the tone it should have when finished. It must be immediately fixed by covering the surface of the canvas with the following solution:—

Hyposulphite of soda	5 ounces
Water	50 „

This solution is poured freely over the surface of the canvas, so as to cover it completely and equally, and allowed to remain upon it three or four minutes only, then repeated, and afterwards the canvas is well washed under the tap; after which it is covered with a solution composed of—

Water	½ pint
Sulphuric acid	30 drops.

With this solution, two minutes' application will suffice; the picture is then again washed in abundance of water, and dried; in this state it will be ready to be painted. If the picture has not all the sharpness and relief of proofs taken on paper, it is at least distinct enough to enable the painter to avoid much of the uncertainty that a doubtful sketch frequently entails.—*Le Moniteur de la Photographie.*

ENAMEL PHOTOGRAPHS BY M. POITEVIN'S PROCESS.

BY M. GUILLEMARE, OF MANS.

M. Poitevin proposed, in 1862, to turn to account the hygroscopy of perchloride of iron by solarisation, in presence of an organic substance, to obtain pictures, either by the aid of carbon on paper or by the aid of metallic and vitrifiable oxides upon enamel.

But to apply M. Poitevin's theory practically, more than one chemical problem has to be solved; and to employ, with your permission, a language familiar to me, these problems, notwithstanding the data which I have the honour of pointing out to you, still contain others in great number yet unknown. I have attempted to discover them.

The enamels upon which I place the pigments mixed with suitable fluxes, and which must give all the details of the negative, is composed in weight of—

Silica	3 parts
Nitre	2·5 „
Flux	4 „

The flux is obtained by forming an alloy of three and a half parts of lead and one of tin, which is calcined in the open air, in order to completely oxidize the metals, until they are reduced to an impalpable powder. Moreover, I reproduce with the same facility, portraits, engravings, and architecture upon hard porcelain, glass and crystal.

The objects covered with the photographic proof are, after complete desiccation, exposed in muffles to such a temperature, that the oxides are converted into silicates. I put sufficient flux with the pigments to glaze the enamels. I perceive many advantages in this; the details come out better, the pictures acquire great softness and delicacy, and a brilliancy that pleases generally; and they are protected by the glaze against external agents. I do not trouble myself about the curvature of the surfaces; it is a matter of indifference to me whether the surfaces are plane, concave, or convex; there is no distortion in the pictures.—*Les Mondes,*

MR. SWAN'S PATENT CARBON PROCESS.

SPECIFICATION.

Mr. Swan's specification, entered at the Patent Office, on the 29th of February, and sealed on the 27th of August, will not be officially published for about a month. We are enabled, however, by the courtesy of the inventor, to place an early copy before our readers. After the usual preamble, it proceeds as follows:—

My invention relates to that manner or style of photographic printing known as carbon, or pigment, printing. In this style of printing, carbon or other colouring matter is fixed by the action of light passing through a negative, and impinging upon a surface composed of gelatine, or other like substance, coloured with carbon or other colouring matter, and made sensitive to light by means of bichromate of potash or bichromate of ammonia, or other chemical substance having like photographic property, those portions of the coloured and sensitive gelatinous surface which are protected from the light by the opaque, or semi-opaque, portions of the negative, being afterwards washed away by means of water, whil the parts made insoluble by light remain and form a print. This kind of photographic printing, although possessing the advantage of permanency, and affording the means of ensuring any required tone or colour for the print, has not come into general use, because of the difficulties hitherto experienced in obtaining by it delicacy of detail, and complete gradation of light and shade.

The difficulties referred to were more particularly experienced in attempts to employ paper coated with the coloured gelatinous materials, and arose from the fact, that, in order to obtain half-tone, certain portions of the coloured coating lying behind, or at the back of the photographically impressed portions required to be washed away, and the employment of paper in the way it has been employed hitherto, not only as a means of supporting the coloured coating, but also to form ultimately the basis or groundwork of the print, obstructed the removal of the inner or back portions of the coloured coating, and prevented the obtaining of half-tone.

Now, my invention consists in the formation of tissues adapted to the manner of printing referred to, and composed of, or prepared with, coloured gelatinous matter, and so constructed that while they allow in the act of printing free access of light to one surface of the coloured gelatinous matter, they also allow free access of water, and the unobstructed removal of the non-affected portions of the coloured matter from the opposite surface, or back, in the act of developing, and I obtain this result either by the disuse of paper altogether, or by the use of it merely as a backing or temporary support of the coloured gelatinous matter, the paper so used becoming entirely detached from the coloured gelatinous matter in the act of developing, and forming no part of the print ultimately.

My invention consists, furthermore, in the special mode of using the said tissues, whereby superior half-tone and definition in the print are obtained as aforesaid, and also of a mode of transferring the print after developing from a temporary to a permanent support, so as to obtain a correction in the position of the print in respect of right and left. In producing the photographic tissues referred to I form a solution of gelatine, and for the purpose of imparting pliancy to the resultant tissue I have found it advisable to add to the gelatine solution, sugar or other saccharine matter, or glycerine. To the said gelatinous solution I add carbonaceous or other colouring matter, either in a fine state of division, such as is used in water-colour painting, or in the state of a solution or dye, or partly in a fine state of division, and partly in solution.

With this coloured gelatinous solution I form sheets or films, as hereafter described, and I render such sheets or films sensitive to light, either at the time of their formation, by introducing into the gelatinous compound bichromate ammonia, or other photographic agent of like photographic properties, or by applying to such non-sensitive sheets or films after their formation a solution of the bichromate or other substance of like photographic property. This latter method I adopt when the sheet or film is not required for use immediately after its formation. I will in my future references to the bichromate of ammonia or the bichromate of potash, or to

other chemicals possessing analogous photographic properties, denominate them "*the sensitizer;*" and, in referring to the coloured gelatinous solution, I will denominate this mixture "*the tissue compound.*" When the tissue to be produced is required for immediate use, I add the sensitizer to the tissue compound; but where the tissue is required to be preserved for some time before using, I prefer to omit the sensitizer from the tissue compound, with a view to the tissue being made sensitive to light subsequently by the application of a solution of the sensitizer.

With respect to the composition of the tissue compound, it will be understood by chemists that it may be varied without materially affecting the result, by the addition or substitution of other organic matters, similarly acted upon by light, when combined with a salt of chromium, such as I have referred to. Such other organic matters are gum arabic, albumen, dextrine, and one or more of these may be employed occasionally to modify the character of the tissue compound, but I generally prefer to make it as follows. I dissolve, by the aid of heat, two parts of gelatine in eight parts of water, and to this solution I add one part of sugar, and as much colouring matter in a finely divided state, or in a state of solution, or both, as may be required for the production of a photographic print with a proper gradation of light and shade. The quantity required for this purpose must be regulated by the nature of the colouring matter employed, and also by the character of the negative to be used in the printing operation. Where it is desired that the colouring matter of the print should consist entirely, or chiefly, of carbon, I prefer to use lampblack finely ground and prepared as for water-colour painting, or I use indian ink; and where it is desired to modify the black, I add other colouring matter to produce the colour desired. For instance, I obtain a purple black by adding to the carbon indigo and crimson lake, or I add to the carbon an aniline dye of a suitable colour, where the colouring matter used is not a solution or dye, but solid matter in a fine state of division, such as indian ink or lampblack, I diffuse such colouring matter through water or other inert liquid capable of holding it in suspension; and after allowing the coarser particles to subside, I add, of that portion which is held in suspension, as much as is required, to the gelatine solution. In preparing tissue to be used in printing from negatives technically known as "weak," I increase the proportion of colouring matter relatively to that of the tissue compound; and I diminish it for tissue or paper to be used in printing from negatives of an opposite character.

Having prepared the tissue compound as before described, I proceed to use it as follows. For preparing sensitive tissue, I add to the tissue compound more or less of the sensitizer, varying the quantity added, according to the nature of the sensitizer, and to the degree of sensitiveness to be conferred on the tissue to be produced from it. For ordinary purposes, and where the tissue compound is made according to the formula before given, I add about one part of a saturated solution of bichromate of ammonia to ten parts of the tissue compound; and I make this addition immediately previous to the preparation of the tissue, and I maintain the tissue compound in the fluid state, by means of heat during the preparation of the tissue, avoiding the use of an unnecessary degree of heat; I also filter it through fine muslin or flannel, or other suitable filtering medium, previous to use, and I perform all the operations, with the tissue compound subsequent to the introduction of the sensitizer, in a place suitably illuminated with yellow or non-actinic light. In forming tissue upon a surface of glass, I first prepare the glass, so as to facilitate the separation of the tissue from it. For this purpose, I apply ox gall to the surface of the glass (by means of a brush, or by immersion), and allow it to dry. The glass is then ready for coating with the tissue compound, or I apply to the glass a coating of collodion, previous to the application of the coating of tissue compound. In this case, the preparation with ox gall is unnecessary. When collodion is used, the collodion may consist of about ten grains of pyroxyline in one ounce of mixture of equal parts of sulphuric ether and alcohol. I apply the collodion by pouring it on the surface to be coated, and draining off the excess, and I allow the coating of collodion to become dry before applying the coating of tissue compound. I generally use a plane surface on which to form the tissue, but surfaces of a cylindrical or other form may sometimes be used advantageously. In preparing sheets of sensitive tissue on a plane surface of glass, I prefer to use the kind of glass known as plate or patent plate. Before applying the sensitive tissue compound, I set the plate to be coated, so that its upper surface lies in a horizontal position, and I heat the plate to about the same temperature as the tissue compound, that is, generally, to about 100° Fahr. The quantity of the tissue compound that I apply to the glass varies with circumstances, but is generally about two ounces to each square foot of surface coated. After pouring the requisite quantity of the tissue compound upon the surface of the plate, I spread or lead the fluid by means of a glass rod or soft brush over the entire surface, taking care to avoid the formation of air bubbles; and I keep the surface in the horizontal position until the solidification of the tissue compound. In coating other than plane surfaces I vary, in a suitable manner, the mode of applying the tissue compound to such surfaces. In coating a cylindrical surface I rotate the cylinder in a trough containing the tissue compound, and after having produced a uniform coating, I remove the trough and keep up a slow and regular rotation of the cylinder until the coating has solidified. After coating the surface of glass or other substance as described, I place it in a suitable position for rapid drying, and I accelerate this process by artificial means, such as causing a current of dry air to pass over the surface coated, or I use heat in addition to the current of air, or I place it in a chamber containing quick-lime, chloride of calcium, or other substance of analogous desiccating property. When the tissue is dry, I separate it from the surface on which it was formed by making an incision through the coating to the glass, around the margin of the sheet, or I cut through the cylindrical coating near the ends of the cylinder, and also cut the coating across, parallel with the axis of the cylinder. When, by lifting one corner, the whole will easily separate in a sheet. Where the tissue compound is applied over a coating of collodion, the film produced by the collodion, and that produced by the tissue compound cohere, and the two films form one sheet. Sometimes before the separation of the coating from the glass, I attach to the coating a sheet of paper for the purpose of strengthening the tissue, and making it more easy to manipulate. I generally apply the paper in a wet state to the dry gelatinous surface, and having attached the paper thereto in this manner, I allow it to dry, and I then detach the film and adherent paper from the glass, by cutting around the margin of the sheet and lifting it off as before described. Where extreme smoothness of surface, such as is produced by moulding the tissue on glass as described, is not of importance, and where greater facility of operation is desired, I apply a thick coating of the tissue compound to the surface of a sheet of paper. In this case the paper is merely used as a means of forming and supporting temporarily, the film produced from the tissue compound; and such paper separates from the gelatinous coating in a subsequent stage of my process. In coating a surface of paper with the sensitive tissue compound, I apply the sheet, sometimes of considerable length, to the surface of the tissue compound contained in a trough, and kept fluid by means of heat, and I draw or raise the sheet or length of paper off the surface with a regular motion, and I sometimes apply more than one coating to the same sheet in this manner. After such coating, I place the coated paper where it will quickly dry, and seclude it from injurious light.

The sensitive tissue, prepared as before described, is, when dry, ready to receive the photographic impression by exposure under a negative in the usual manner, or by exposure in a camera obscura to light transmitted through a negative in the manner usual in printing by means of a camera. I prefer to use the sensitive tissue within two days of the time of its preparation. Where the tissue is not required for immediate use, I omit the sensitizer from the tissue compound as before mentioned, and with this non-sensitive tissue compound I coat paper, glass, or other surface, as described in the preparation of the sensitive tissue or paper. In preparing sheets of non-sensitive tissue by means of glass, as described, I use no preliminary coating of collodion. I dry the non-sensitive tissue in the same manner as the sensitive, except that in the case of the non-sensitive tissue, seclusion from daylight is not necessary.

The non-sensitive tissue is made sensitive when required for use by floating the gelatinous surface upon a solution of the sensitizer, and the sensitizer that I prefer to use for this purpose is an aqueous solution of the bichromate of potash containing about two and a half per cent. of this salt. I apply the sensitizer, by floating or otherwise, to the gelatinous surface of the tissue, and after this, I place it in a suitable position for drying, and exclude it from injurious light.

In applying to photographic printing the various modifications of the sensitive tissue, prepared as before described, I place the sensitive tissue on a negative in an ordinary photographic printing frame, and expose to light in the manner usual in photographic printing. Or, I place it in a camera obscura in the manner usual in printing by means of a camera obscura. When the tissue employed is coated with a film of collodion on one side, I place the collodionized side in contact with the negative, or where it is used in the camera, I place the collodionized side towards the light passing through the camera lens. Where the tissue is not coated with collodion, and where paper forms one of the surfaces of the tissue, the other surface being formed of a coating or film of the tissue compound, I place this last-named surface in contact with the negative, or when using it in the camera, I present this surface towards the light transmitted by the lens. After exposure for the requisite time, I take the tissue from the printing frame or camera, and mount it in the manner hereinafter described (that is to say), I cement the tissue with its exposed surface, or, in other words, with that surface which has received the photographic impression, downward upon some surface (usually of paper) to serve temporarily as a support during the subsequent operation of developing, and with a view to the transfer of the print after development to another surface, or I cement it (also with the exposed or photographically impressed surface downward)

upon the surface to which it is to remain permanently attached. The surface on which it is so mounted may be paper, card, glass, porcelain enamel, &c. Where the tissue has not been coated with collodion previous to exposure to light, I prefer to coat it with collodion on the exposed or photographically impressed side before mounting it for development, but this is not absolutely necessary, and I sometimes omit the coating with collodion, more particularly where the print is intended to be coloured subsequently. Or where I employ collodion, with a view to connect the minute and isolated points of the print firmly together during development, I sometimes ultimately remove the film it forms, by means of a mixture of ether and alcohol after the picture has been finally mounted, and the support of the film of collodion is no longer required. In mounting the exposed tissue or paper (previous to development) in the temporary manner with a view to subsequent transfer to another surface, I employ in the mounting a cement that is insoluble in the water used in the developing operation, but that can be dissolved afterwards by the application of a suitable solvent, or one that possesses so little tenacity that the paper or other support attached temporarily to the tissue or paper by its means may be subsequently detached without the use of a solvent.

The cements that may be used for temporary mounting are very various, but I generally prefer to use a solution of india-rubber, in benzole or other solvent, containing about 6 grains of india-rubber in each ounce of the solvent, and I sometimes add to the india-rubber solution a small proportion of dammar-gum or gutta-percha. In using this cement I float the photographically impressed surface of the tissue upon it, and I treat in a similar manner the paper or other surface intended to be used as the temporary mount or support during development, and after allowing the benzole or other solvent to evaporate, and while the surfaces coated with the cement are still tacky, I press them strongly together in such a manner as to cause them to cohere.

When the photographically impressed, but still undeveloped tissue is to be cemented to a surface that not only serves to support the picture during its development, but also constitutes permanently the basis of the picture, I prefer to use albumen or starch paste as the cementing medium, and where I employ albumen, I coagulate or render it insoluble in water (by means of heat, by alcohol, or other means), after performing the cementing operation, and previous to developing. In the permanent, as in the temporary, mode of mounting, I cement the tissue *with its photographically impressed surface downward*, upon the surface to which it is to be permanently attached. After mounting the tissue, as before described, and allowing the cement used time to dry, where it is of such a nature as to require it, I then submit the mounted tissue to the action of water sufficiently heated to cause the solution and removal of those portions of the coloured gelatinous matter of the tissue, which have not been rendered insoluble by the action of light during exposure in the printing frame or camera. Where paper has been used as a part of the origiual tissue, this paper soon becomes detached by the action of the warm water, which then has free access to the under stratum, or back of the coloured gelatinous coating, and the soluble portions of it are therefore readily removed by the action of the water, and by this means the impression is developed that was produced by the action of light during the exposure of the tissue in the printing frame or camera, and the picture remains attached to the mount cemented to the photographically impressed surface previous to development. I allow the water to act upon the prints during several hours, so as to dissolve out the decomposed bichromate as far as possible. I then remove them from the water, and allow them to dry, and those not intended for transfer, but that have been permanently attached to paper, previous to development, I finish by pressing and trimming in the usual manner. Those which have been temporarily mounted, I transfer to paper, card or other surface. In transferring to paper or card, I coat the surface of the print with gelatine, gum arabic, or other cement of similar character, and allow it to dry. I then trim the print to the proper shape and size, and place its surface in contact with the piece of paper or card to which the transfer is to be effected, such piece of paper or card having been previously moistened with water, and I press the print, and mount strongly together; and after the paper or card has become perfectly dry, I remove the paper or other supporting material temporarily attached previous to development, either by simply tearing it off, where the cement used in the temporary mounting is of a nature to allow of this without injury to the print, or I apply the temporary mount, benzole or turpentine, or other solvent of the cement employed, or I immerse the print in such solvent, and then detach the temporary mount, and so expose the reverse surface of the print; and after removing from the surface of the print, by means of a suitable solvent, any remains of the cement used in the temporary mounting, I finish the print by pressing in the usual manner. If, however, the print be collodionized, and be required to be tinted with water-colour, I prefer to remove the collodion film from the surface of the print, and this I do by the application of ether and alcohol.

Having now set forth the nature of my invention of improvements in photography, and explained the manner of carrying the same into effect, I wish it to be understood, that under the above in part recited letters patent, I claim:—First, the preparation and use of coloured gelatinous tissues in the manner and for the purpose above described.

Secondly, the mounting of undeveloped prints obtained by the use of coloured gelatinous tissues, in the manner and for the purpose above described.

Thirdly, the remounting or transference of developed prints produced, as above described, from a temporary to a permanent support.

In witness whereof, I, the said Joseph Wilson Swan, have hereunto set my hand and seal, the 27th day of August, in the year of our Lord, 1864. JOSEPH WILSON SWAN.

PHOTOGRAPHY: WHAT HAS BEEN ITS INFLUENCE ON MODERN ART?

WE extract from our interesting contemporary, the *Art Student*, the following discussion at a meeting of gentlemen designating themselves "The Society of Art-Quibblers." The subject, which was the Influence of Photography on Modern Art, was opened by Mr. Holyoake, a gentleman officially connected with the Royal Academy. Although some of his remarks are inappreciative and unjust to photography, there are others well worthy of the attention of photographers.

This, said Mr. Holyoake, is an important question, and we cannot err in devoting attention to it, more especially as it affords great scope for debate. That modern art has been largely influenced by the introduction of photography, few will deny, and then comes the question—has that influence been good or bad? It is an unfortunate fact, both for art and photography, that the general public have been rather inclined to test art by photography than photography by art. Hence much of the good which either might derive from each, has been lost to both. The great fault in photographs is, that they display such an entire ignorance of art on the part of their producers, and this ignorance not only robs photographs of their beauty, but also to a very large extent of their truth, although this last fact is not so widely recognized as the former. On the other hand, deterred by photographic violations of truth and beauty, the artist frequently overlooked those points in which photography is a good and veritable teacher. Nothing conveyed so forcible an impression of the infinity and delicacy of nature's tones and details as a good photograph does, and if only for this great lesson, it should be heartily and warmly welcomed into the artist's studio. In this respect the photograph, however, owed its value not to artistic but to scientific knowledge, inasmuch as the most inartistic photograph, if well taken, conveyed these qualities quite as well as the most artistic. He (Mr. Holyoake) fully recognized the capability of the art-science when in the hands of artistic photographers, and thought there was a most important strong necessity for educating photographers in the practical application of the principles of art, although he feared there was very little inclination on their part to take up earnestly this all-important branch of study. One art acts and re-acts upon the other; so when photographs under the influence of artistic study become more artistic, they would also become more serviceable as art-educating mediums, instead of as now, lowering and degrading to so large an extent the public appreciation of good art. He (Mr. Holyoake) thought that modern art owed much that was unambitious in its tone and sentiment, to the direct or indirect influence of photography. The cry for detail, to the exclusion of breadth, sentiment, and aërial truth, to which the P. R. B. responded, most probably arose from the public appreciation of, and belief in, photographs, and the present exhaltation of mechanical excellences above those which are intellectual, is as probably due to the same source. In one phrase of mechanical photography—the copying of works of art—scientific knowledge is the great and only requirement,* and at present, photography is doing in this way as much good as it is doing harm in the other way of disseminating and creating a public taste for the inartistic and untruthful. Photographic portraiture, as it is now conducted, is a mere species of manufacture, as mechanical in its processes as are those by which pins, needles, and such like gear are produced, the chief aim of the operation being either speed, or what is the same thing, cheapness. The faults of photographic landscapes are patent to all who have studied nature for pictorial results, although mere photographic operators are, like the general public, blind even to the most glaring of such faults. Photographs render light and shade falsely; they ignore

* This is a very common delusion. The fact is, that without some art-culture, the photographer will rarely produce a good copy of a work of art, simply because he will not know in what its excellence consists, and will not know the difference between a good copy and a bad one. The educated eye will perceive the beauties or defects, which the merely mechanical manipulator would never dream of looking for.—ED. PHOTO. NEWS.

tone, both in its relationship with light, atmosphere, and colour, and they are not true in their relative proportions; hence attempts to display true art in such productions are entirely hopeless. With reference to the making of pictures or figure subjects by such a semi-mechanical semi-scientific process, although the photographer might have all the acquirements and experience of a clever artist, the amount of success achieved in this direction must at the best be very small and imperfect, insufficient indeed to justify any such attempt.

Mr. Wall, in opening the discussion, said, although agreeing with much that had fallen from their excellent chairman, he thought the faults pointed out as the necessary results of the photographic process could be, and indeed were, sometimes overcome by the artistic knowledge which Mr. Holyoake had rightly described as being in the photographic world so "conspicuous by its absence." Only those artists who, like himself, had a practical acquaintance with this art-science, could understand this. Arguing from the scientific theories on which the foundations of photography were laid, it did appear as if the pictorial qualities associated with the true expression of light, atmosphere, and proportion, must be unavoidably falsified and misrepresented. For instance, certain light colours being more chemically active than certain dark colours, and *vice versa*, must, it would seem, cause dark colours to be represented by light tones, and light tones by dark colours. Again, lenses of a description so remarkably unlike, as well as like, those natural lenses through which the images of nature are conveyed to the mind, cannot, so theorists say, represent the forms of nature accurately. But despite all these and similar objections, in exceptional cases, and where artistic talent has been employed, photographs are produced in which we recognize the utmost perfection of all the qualities these theoretical objections appear to render impossible of attainment. The lens being a more or less imperfect instrument requiring nice adjustment and optical knowledge to produce truthful forms and proportions, cameras are constructed to aid the operator who desires and recognizes truth in so managing them, as to get correct images of external objects. The mere exposure of the plate in the camera—although few suspect it—requires the guidance of taste and artistic knowledge, together with an appreciation of nature's appearances under the influence of certain lights and atmospheric conditions, for a few seconds too few or too many may destroy or chronicle those subtle truths on which the real sentiment and power of the resultant picture depends. Then, again, in the development of the exposed plate, the operator can get just that effect at which he aims by judicious management. This operation being only a continuation of the action already set up by light in the camera, during which, parts not sufficiently acted upon may frequently receive more development, and parts which are already sufficiently acted upon, less development. Even when it is impossible to get over a difficulty of this kind, the process of "intensifying," as it is called, will often lend its aid to complete the desired qualities, by thickening the deposit of silver here or there. And, once again, should all these means prove inadequate, we still have the printing, during which the whole process of producing the picture is, in fact, although not literally, gone over again, and at every stage of it we have new and fresh powers of modifying and altering by the most legitimate means—that is to say, by the simple aid of light and chemistry—all these defects or effects. So you see I hope, gentlemen, how an art may be theoretically very defective and uncertain, and yet, in practice, under the guidance of talent and knowledge, produce perfect and certain results. But this only tends to enforce Mr. Holyoake's assertion of the necessity of photographers acquiring an appreciative taste for, and knowledge of, true art. He (Mr. Wall) regretted greatly that he was not aware that the present subject would be discussed that evening, or he would have produced specimens by Rejlander, Bedford, Robinson, Wilson, and others, in illustration of his views, and in support of his assertions. With reference to figure subjects, Mr. Holyoake laboured, he thought, under a somewhat false, although excessively common error, in arguing that because all the superior artistic elements of such pictures must be supplied rather by the model than by the artist, that, therefore, no real valuable success could be attained in this direction. In illustration of his own view of this, he did not think he could do better than tell an anecdote of the well-known artist and photographer, Mr. O. G. Rejlander. Most of those present had perhaps seen in one of the earlier numbers of the *Art-Student* a wood-cut from this gentleman's photograph of "The Amusing Secret." Although that wood-cut did not do justice to the photograph (no wood-cut could), it conveyed a good idea of the reality and thorough expressiveness of the grinning face of the listener. Now Mr. Rejlander saw that that identical model with that identical expression, listening to a real secret, and, inviting him to his studio to sit for a picture, *posed* him, and whispered, just before the exposure of the plate, a comical secret, which at once brought out the required expression. An ordinary photographer would have asked his model to try and give the same expression again, without supplying the cause from which such an expression arose, and would, as Mr. Holyoake implied, have utterly failed, as, indeed, most photographers do. But there are more ways than one, you see, of accomplishing a desired end, and we ought to hesitate a good long time before we utter that little word "impossible." Facts may *seem* to justify its pronunciation, but then there's "nothing so false as facts, except figures."

Mr. Foot said the question as to what good photography had done to art in one direction, had not been touched upon. Its influence in portraiture, whether for good or ill, was enormous. Again, there was another question associated with the blending of art with photography, viz., that of painted photographs. Were these desirable or the reverse? For his own part, he could see no reason why a skilful colourist should not employ himself upon a good photograph, although as photographs were "painted" now-a-days, he could not say he regarded the process, speaking generally, as an improvement. Colour certainly was essential to the truthful rendering of nature, and, therefore, an artistically painted photograph might be said to be superior to a plain photograph, unless, in the painting, some unskilled and ignorant colourist had destroyed photographic beauties and not secured others.

Mr. Evans advocated photography as an adjunct to the painter's studio, in which its uses where numerous and valuable.

Mr. Freezor thought the artist would lose refinement and feeling if he took to painting or drawing from photographs.

Mr. Wall would on some other occasion show how the study of photographs judiciously conducted, would really tend to increase and strengthen these very qualities.

MR. POTTER was not sufficiently familiar with photography to enter into its practical questions; but, with due reference to that fact, he would venture to say one thing had struck him with regard to a new application of the art—photo-sculpture—which was this: the images of nature being condensed by the lens must, he should think, give a concentrated sharpness and distinctness which would be productive of hardness and rigidity in the statuette. When doing small things in sculpture the great difficulty was in avoiding hardness and securing breadth, and it seemed to him that the same evils existed in all photographs from nature, and would necessarily affect the appearance of small works executed by the process of photo-sculpture. He advanced this with all due modesty, because of his ignorance of photographic science.

At the conclusion of the discussion,

MR. HOLYOAKE rose to reply. He said he had perforce purposely omitted many questions deserving attention, the subject being a very comprehensive one; but he was glad to have originated a discussion such as had just closed. He then proceeded to support the views he had advanced, and shortly after the meeting adjourned.

Correspondence.

THE PATENT BLINDS.

SIR,—One of your correspondents asked in substance, through your journal of the 19th inst., whether if he were to use an ordinary Venetian blind attached to the windows of his glass room he would be infringing Mr. McLachlan's patent. I also proposed a similar question through a contemporary, but, Mr. McLachlan seems to regard such questions as "transparent twaddle," and says it is not his duty to give detailed descriptions of his blinds. Perhaps it it is not, but I cannot think that a fair dealing man, anxious to maintain his own, and nothing more, would refuse to give such details, at least so far as to set the question at rest as to whether he really considers that he has patented the ordinary Venetian blind in its application to the photographic gallery. In your answer to your correspondent you intimate that to patent such a thing would not be "in accordance with the dictates of common sense;" yet after quoting from the specification the description of the patent blinds, you say "In this our readers will see a description of the *Venetian blinds*; now is it really then what is not in accordance with the dictates of common sense which forms the essence of this patent? I will frankly do the patentee the justice of refusing to believe so, especially as he himself tells us that he excludes the sun by another method "than by the ordinary blinds." If not by *ordinary blinds*, then certainly not by the Venetian blind, but rather by a *specified modification* of that blind; this appears to be the opinion also which you have arrived at, after maturely studying the entire question. Now, then, upon this view of the matter, if a gentleman has a Venetian blind attached to the window of his sitting room, but thinks it would be more useful to him in his photographic gallery, I cannot see upon what pretence Mr. McLachlan could place himself at the door of that gallery and refuse to let him pass in with it until he had paid him five pounds for doing so;

and if he cannot or does not intend to make such a demand in such cases, why does he not say so and thus relieve photographers from an apparently threatened litigation for doing that which they have a perfect right to do so far as he appears to be concerned?

Mr. McLachlan says that his system of blinds is the only one which "has any claim to be considered scientific;" but he appears to me to be by far too dogmatic in his language, which will only be taken by photographers for what it is worth. Are there not very many eminent gentlemen whose productions in every respect rank as high as his, whose mode of lighting their sitters is as fully entitled to the appellation of scientific as his, and yet who would not tolerate his blinds in their studio for a single day? Let me state a few *facts* bearing upon this point, one of which you have, I believe, already referred to.

1. One of the first photographers in the metropolis has tried these blinds in his gallery, and found them useless.

2. The same gentleman had arranged for them to be put up in another gallery, of which he was proprietor, in another town; but after their failure in London he refused to have the arrangement carried out.

3. Mr. McLachlan himself could not use his blinds in his own gallery, but instead of pulling them down and trying something else more scientifically suited to it, *he pulled his gallery down*, and rebuilt it with another aspect, in order to make his blinds useful to himself.

4. The blinds which he is now fitting up are not his *patented ones* at all, but a modification of them proposed and carried out by another individual.

5. When this individual proposed this innovation upon his patent, Mr. McLachlan scolded him very severely for thinking it necessary.

Now, if the committee he proposes ever sees the light, I hope these facts will not be overlooked; and if it be desired by such committee, I will give the names of the parties who can substantiate them. And it would be as well when such committee commences its labours to decide first of all which system of blinds is to be tested—the patented ones or the modification I have just referred to.

Again, is it not somewhat anomalous to have to build a gallery in order to try whether these patented blinds are of any use to the photographic public? Suppose they answer in such a gallery as it is intended to specify, will that be any proof that they will answer in the thousands of galleries already in use, the great majority of which science and experience have demonstrated to be the best adapted for photographic portraiture?

If, after the blinds have been fairly tested, they are found to be useless, the patent, we are told, will be withdrawn. Now, Mr. Editor, I hope you will pardon me if I tell you that when I read this announcement, feeling my risible muscles somewhat excited, I turned my eye from the sentence to the top of the page to see whether it was the PHOTOGRAPHIC NEWS I had got hold of, or your facetious contemporary *Punch*, who sometimes does a little in the photographic line. Of what earthly use will it be to anybody whether or not he withdraws this patent, when it has been proved to be absolutely useless, not only in ordinary photographic galleries, but in one specially constructed to make them answer their intended purpose? But, perhaps, the language means more than is at first apparent. Are we to understand from it, that if the committee decides against the blinds, and the patent is withdrawn, he will feel himself called upon to return to those their money who have paid him a royalty for a worthless patent right? At all events, this is a question for the consideration of those who have any thoughts of trying these blinds, but have not yet parted with their money.

I begin to feel, sir, that as the edge of my dissecting knife has been rather keen, I shall be no more successful in getting an answer to this letter than before; but as Mr. McLachlan has great confidence in you, could you not, through the medium of your soothing chloroform obtain from him the information which so many photographers desire, besides the one who has got himself into this

DIFFICULTY?

PLAIN PAPER *v.* ALBUMENIZED PAPER.

DEAR SIR,—I have been confined to my room for several days through an attack of erysipelas in the foot, and, amongst other pastimes to beguile the tedious hours, I have reviewed my old photographic productions, comparing them with the more recent ones, &c. &c., which has suggested to my mind the following notes:—

I believe that (properly manipulated) photographs on plain salted paper are permanent. I have some by me fourteen years old as pure in blacks and whites, and middle shades, as when first produced. You will reply, "But this is no proof of true permanency." Granted, but can anything be shown on albumenized paper that has stood so long a test? I remember some ten years since hearing Mr. Kent, of the firm of Hennah and Kent, making a remark about albumenized paper, "that he repudiated a photograph on a greasy surface," which remark did not surprise me when I considered the unequalled engraving-like productions then being issued by those gentlemen. I have some of them by me now as pure and rich in tones as when first sent out, and now full ten years old.

But I think I hear you say, "What's the use of all this preamble, which many besides yourself know very well? You can't use plain paper for cartes de visite, because the surface, after preparation, is too rough."

Patience, Mr. Editor, if you please, that's just what I'm coming to. Some eight years ago I received from Messrs. Marion a small folio of samples of photographic papers, amongst them was one piece of unusual smooth surface, very different to all the others; it did not take my attention so much at first, but shortly afterwards I prepared it, and printed two 5×4 portraits on it, and was astonished to find them, when completed, as smooth on the surface as prior to the first preparation, quite equal to albumen,* of course I soon made my way to Messrs. Marion for a supply, but, alas! it was all gone, and though I have called repeatedly since, I have seen nothing like it; still, I presume, if it *has* been made, it is possible to reproduce it. As to the price, why, it would be a secondary consideration compared with the advantage gained, for it could hardly exceed the price of best albumenized. In the "Answers to Correspondents," in your last number of the NEWS, the replies to "A Sufferer" are, I am sorry to say, too true. Depend upon it, sir, the sale for a first-rate quality of paper will always find purchasers, and at a fair remunerative profit to the maker.

As numbers of your correspondents have made their remarks upon albumenized paper, I must beg a little more space to have my say. Prior to the introduction of the carte portrait, which has caused the demand for albumenized paper to so increase, I prepared my own, and I find the prints of that time very little altered; whereas, those of within this last three years are visibly changed. In the preparation of my albumen, I simply iodized it with chloride of sodium, twelve grains to the ounce, but I took the precaution to always have my eggs *new*, all laid within a fortnight. I believe this has much to do with the future durability of the photograph. Of course it would be impossible to obtain sufficient new-laid eggs to supply the present demand; but to those amateurs who have time and inclination to make their own, I particularly recommend this for their consideration, believing that the sulphur generated in stale albumen the great cause of early fading in the photograph.

In conclusion, I must say a word or two about "Photography on Wheels." I have always been very fond of taking photographic views, which, compared with portraiture I liken unto fly-fishing and angling from a punt. "Somerset's" (is it the Duke) final suggestion is a very wise one,—"to combine 'Amateur's' *two* wheels with his *one*,"—this would make a perambulator, which must certainly be the easiest propelling vehicle of all, and with a little manœuvring could be used with one, two, or three wheels at the will of the wheeler.—I am, sir, yours respectfully,

R. H. DYBALL.

3, *Lower Notting Hill Terrace.*

[We shall have pleasure in seeing the plain paper prints to which our correspondent refers. We are no lovers of an albumenized surface for pictures; it has a vulgar effect at best, but we fear it will be difficult to depose it. Stale albumen is doubtless a cause of much annoyance.—ED.]

CHEAP SOURCES OF ELECTRICITY.

SIR,—Your weekly summary of "Scientific Gossip," for July 8th, contains some observations of especial interest to me, and, I have no doubt, to all your readers as well. The subject being the production of electricity in quantity with

* I think I have one of these portraits by me now, if a sight of it would at all interest you in respect to the papers,

due regard to economy of expenditure and cheapness of apparatus. The facts there stated, beyond being highly interesting, and perhaps opening up a new field of inquiry, scarcely realize anything with regard to the opening proposition, viz., the production of electricity cheaply, carbon as the positive elemeut, and used in the manner stated, combined with a negative platina immersed in nitrate of potash, and heated with gas, can never be considered a cheap form of battery, nor, in my estimation, at all convenient to use. It is stated rather indefinitely that half a dozen such pairs decomposes water rapidly; so does half a dozen of either of Bunseu's, Grove's, or Maynooth's: indeed, a single cell of any of these may be said to decompose water rapidly. I wish the expenditure of material, the percentage of gas collected in a given time had been stated, then we should have had data for comparison with other forms of battery.

What is wanted is a form of battery that will satisfy the following conditions, viz., economy of price in first construction, moderate expenditure of material while in action, electricity great in quantity, and as high in tension as possible; although this latter quality might be sacrificed in the case of the electric light being the special requirement. Easily put in action, and constant therein, with entire immunity from nitrous fumes.

I scarcely expect to increase the interest with regard to these conditions of battery, as the problem has been before the scientific world for years, and still remains unsolved.

Unquestionably, the magneto-machine under certain exceptionable conditions, fulfils more of these requirements than any other form of battery. The objections are the enormous cost of it to begiu with, the necessity for steam power; and where this is already in use, and the primary expense of the machine can be met, it is everything that could be wished; easily and rapidly put in action; as easily dispensed with, cleanly and elegant, so that the most dainty need not soil their fingers with it.

But, after all, why should I be charged a moderate price, say 12s., for one of the best and most powerful magnets, when purchased from the ironmonger; but which being wanted for a magneto-machine, I find the poles set too closely together, which fact necessitates my purchase being made at the philosophical instrument makers, and to my horror, and even disgust with the whole matter, I am charged not a small percentage extra for the difference of form (although I am at a loss to understand how this should make any difference in price); but a charge which nothing short of absolute necessity could justify one in paying?

Demand, and, as a consequence, competition would do much to level the charge to the intrinsic value. For a small magneto-machine, I have been asked as low as eighteen shillings. At another establishment, I was quietly told the price was £2 10s., the machine being identical in every respect. My exclamation was, "Heaven helps those who help themselves;" and I found it emphatically so. I set about making one myself, and the result is that I have a machine more powerful than those usually sold; and the cost altogether 16s. 6d. only. I now proceed to institute a comparison of the cost of construction of a single cell of each of the three batteries mentioned, viz., Bunsen's, Grove's, and Maynooth, the surface exposed to chemical action being (roughly estimated), the same in each, and I beg to premise that the batteries being all fitted up with my own hands, and which any clever photographer (which I presume they all are), can do also.

The expense of labour is not included. And, first, as regards the Maynooth, or cast-iron battery; a piece of deal is to be procured 3-16ths of an inch thick, planed smooth on both sides; out of this a box must be made of the following dimensions:—breadth, 5 inches; depth, 5¼ inches; width from side to side, ¾ ditto, all outside measurement.

These dimensions are given with strict regard to economy in the quantity of nitric acid required, this being the most serious item in the expense of all these batteries, it will contain sufficient to last at least three hours, and must be renewed when the slightest sign of action on the iron is apparent, which will occur when NO5 becomes NO4. This box forms the pattern, which can be sent to Mr. Gray, of South Lambeth, and he will cast a single cell for 1s., or a number at a still lower charge. The comparative expense of each will be as under, viz.:—

BUNSEN'S

	s.	d.
1 Carbon	1	0
1 Zinc	1	0
1 Porous cell	0	6
1 Glass jar	0	6
2 Binding screws	1	0
Total	4	0

GROVE'S.

	s.	d.
1 Platina	2	6
1 Zinc	0	9
1 Porous cell	0	6
1 Trough	0	6
2 Binding screws	1	0
Total	5	3

MAYNOOTH.

	s.	d.
1 Cast iron	1	0
1 Zinc	0	3
1 Porous cell	0	6
2 Binding screws	1	0
Total	2	9

The above is a correct statement of what it has cost me to fit up single cells of each; but in the case of quantities being required, the wholesale prices would reduce these charges very much. For instance, the porous cells can be had for 4s. per dozeu, and even less. The platina can be had from Cotton and Johnson, Grafton Street, or Johnsou and Matthey, Hatton Garden, who will kindly roll it out to any size, thus reducing the expense of it to a minimum. These different arrangements are all about equal in quantity of current produced. No doubt Grove's has an incomparably higher tension, and for certain researches this is of the highest importance, but for the purpose under consideration, viz., the electric light, I have not observed any marked superiority as long as they remain in good condition, and this is an advantage Grove's has over the others, viz., what is fatal to the continued action of the Maynooth battery, is attended with no other inconvenience thau a weakening of power in Grove's, as it still continues to act, though feebly, even when almost every atom of oxygen has been absorbed by the liberated hydrogen.

On the other hand, the carbon in Bunsen's battery becomes charged with hydrogen, so that the current will not continue active so long as Grove's.

For a succeeding employment of this form of battery, the carbons must be thoroughly soaked in water 24 hours, and repeatedly changed until the water runs off tasteless, then dried and heated strongly. This seems to expel all the hydrogen; by this means, I can always depend on my carbons acting energetically.

Carbon standing higher as a negative element than either platinum or iron, Bunsen's ought, as a consequence, to form a more powerful source of electricity than Grove's, which it actually does, for the time it works well; continuing longer, and more equally in action, than the Maynooth; but certainly not so long as Grove's. In my experience, it is decidedly more expensive and troublesome to work than either of the others.

Photometrically compared with twenty-five elements of Bunsen's, ditto of Maynooth, with thirty of Grove's, the illumination seemed equal, and will suit very well for printing. Copying from the flat may be very successfully con-

ducted with this light. For copying bas-reliefs in plaster, or other light coloured material, it is even more suitable than daylight.

The shadows cast by the electric light have a peculiar intensity and depth of blackness that totally unfits it for photographing subjects from the round: hence portraiture can never be successful with this light. Some time back, Mr. Fitzgerald, editor of the *Electrician*, promised the readers of the Photographic News some information about the use and construction of batteries cheaply for photographic purposes. I certainly would feel highly gratified should the above remarks on batteries recall his attention to that promise.—I am, dear sir, your obedient servant,

Peter Henderson.

Clapham, August 21, 1864.

[Mr. Fitzgerald is at present abroad. We hope, when opportunity serve, to hear more from him on the subject—Ed.]

Photographic Notes and Queries.

Pinholes in Plates.

Sir,—As well as my neighbours, I have of late been much annoyed with pinholes (as they are professionally termed), in my collodion plates, and have tried all sorts of schemes to remedy the nuisance; at last I hit upon the plan suggested at page 32, in your this year's "Book of Photography," and put two drs. of a solution of cyanide of potassium (of the strength used for clearing the negative), into a pint of bath solution, after exposing such to the sun for twenty-four hours, filtered it, and for a *short time* I obtained beautifully clean pictures; and then pinholes as bad as ever. I have been an amatour in the art photographic for nine years, and never until the *last twelve months* was I ever troubled in this manner. Can it be attributed to the iodizer? as experience teaches me that the darker coloured collodions are more productive of pinholes than the lighter or amber coloured. Perhaps some of your chemical correspondents may suggest a cause, as in my case heat or cold has nothing whatever to do with the matter. I have one of the most perfect studios in the kingdom, and my dark room is always at one temperature, as I have every convenience for regulating such.—Yours obediently, An Amateur.

September 3rd, 1864.

[Have you assured yourself that if is not from excess of iodide in your bath that the pinholes arise? If you have not tried diluting the bath with an equal bulk of water, filtering, and then adding nitrate of silver to make it the proper strength, pray do so, and let us know the result.—Ed.]

Mr. Swan's Carbon Process.

Sir,—In order to shorten and simplify the above process, I some time ago tried coating the glass plate with the solution of benzole, india-rubber, and dammar, in the place of collodion. In the few experiments tried, the gelatine came off the glass as perfectly as if collodion had been used, and it did not stick to the negative, *or require floating* before being attached to the paper for development, thus shortening Mr. Swan's original process. When much dammar was used, there was a tendency to line marks on the film, if a pause was made in drawing it off the glass plate; it had to be separated with a clean and steady sweep. A few pictures only were thus tried; so, perhaps some of your readers will work out the idea, and give the results.—Yours truly,

Merthyr Tydfil. W. H. Harrison.

The Stolen Lens.

Sir,—With reference to the stolen lens from my studio, of which you gave information in your Journal of last week, I beg to state that the property has been recovered, it having been purchased in the ordinary course of trade by Mr. Lawley, Farringdon Street. The thief is still at large, but I doubt not of his ultimate apprehension.

It is justice to mention that the transaction with Mr. Lawley was in every respect honourable; the lens was given up to me without hesitation, on very easy terms.

From a fault in transcription the number of the lens should have been 10,098, not 10,090. I think it important that notice should be taken of this, as the mistake may seriously affect the party who may be in possession of the lens bearing the assumed number.—Yours truly, G. J. Tear.

6, *Upper Dorset Place, Clapham Road, Sept.* 16*th*, 1864.

Talk in the Studio.

Photography in the Army.—The decision has at length been adopted by the Horse Guards, to employ the various drummer-boys, buglers, and other lads attached to the Royal Engineer Establishment, Chatham, in some one or more of the trades followed by the Royal Engineers, and so training them up to become skilled workmen. Each to be allowed to select the trade in which he is desirous of being employed, as now practised at the Royal Engineer establishment, including photography, printing, engraving, &c.

Lamps for Magnesium Wire.—Mr. Alonzo G. Grant has just invented a clever little lamp for the convenient and regular combustion of magnesium wire, so as to give a constant light. The wire is wound on spools and delivered by means of a clock-work arrangement, so that a proper quantity is always pushed forward for burning. To secure non-intermission from the imperfection of the wire, Mr. Grant burns two small wires delivered from the spools and pushed from one tube, instead of one of twice the thickness, so that if from some imperfection one wire goes out for a moment, it is at once re-ignited by the flame of the other, thus obviating the necessity of a flame underneath. The wire burns in front of a concave reflector which aids in directing the light.

Indian Photographic Journal.—We learn from the last number of the *Journal of the Bengal Photographic Society*, that a new monthly Indian photographic journal is in contemplation, to be published at Allahabad. It is to be devoted to a narration of the experiences of Indian photographers, and the especial exigencies of photography in the climate, together with a collation of the best articles from other journals. The size, it is stated, will be the same as that of the Photographic News, and the subscription with postage twelve rupees per annum. We wish the project every success.

New Head Rest.—A head rest has just been patented in America, having the same object as an invention some time ago introduced into this country, that of giving support to a standing figure without being visible. The lower portion is said to consist of two flat standards, and a cross-head containing a socket, combined in a peculiar manner. The central or sliding rod is also provided with a ratchet, and on the socket is a spring pawle to retain the rod, without the aid of a screw.

To Prepare Albumen Prints for the Reception of Colour.—Dr. Vogel, in a letter to the editor of the *Bulletin Belge*, states that in one of the meetings of the Photographic Society, the subject of touching-up and tinting albumen prints was discussed. Mr. Schliepmann recommended the addition of carbonate of soda to the colours in order to cause them to run smoothly. Mr. Oehme's plan is to rub off the albumenous gloss of the print, by means of india-rubber, before applying the colours. Mr. Voight advises the use of a few drops of glycerine on a tuft of cotton wool, in order to moisten the surface of the print before the colours are applied. And, finally, Mr. Danze moistened the surface with a solution of barley sugar for the same purpose.

Royal Cornwall Polytechnic Society Medals.—The award of medals at this exhibition, now open at Falmouth, is as follows:—First silver medal and premier prize, H. P. Robinson, for "Autumn," and a "Warwickshire Lane. Second silver medal, Vernon Heath; first bronze medal, F. H. Morgan, Bristol; second bronze medal, R. H. Yeo, Plymouth; second bronze medal, W. Brooks, Penzance; second bronze medal, H. Cox. The premier medal now awarded to Mr. Robinson completes the dozen obtained in half-a-dozen years.

Poisoning by Cyanide.—In a recent case of poisoning, Dr. Letheby gave the following evidence as the action of cyanide of potassium as a poison, after analysing the contents of the stomach, and find potash and sulpho-cyanogen:—Dr. Letheby gave his opinion that, from the presence of sulpho-cyanogen, cyanide of potassium, a deadly poison, was the substance taken. Its active principle is prussic acid. The 40 grains of potash

found in Mrs. Gribbin's stomach would represent 3 grains and one-tenth of cyanide of potassium, the commercial article being impure, and containing only about 20 per cent. of cyanide. That quantity would be quite sufficient to cause death. The decomposition of the stomach would fully account for the fact that no cyanide of potassium was actually found, for decomposition had the effect of dissipating it. All the appearances were those of deaths from poison. Cyanide of potassium is much used by photographers, and it is one of the poisons most easily procured. Dr. Letheby said that he had had to examine many cases of poisoning by means of that drug.

To Correspondents.

C. K.—The black precipitate in your toning bath is the gold in a state of powder. It may be reconverted into chloride of gold in the usual way, by solution in nitro-hydrochloric acid; but being thus precipitated, the bath has, of course, lost its toning powers. The cause of the precipitation we cannot state without knowing more of its history; possibly, being slightly alkaline and standing in the light; possibly, the introduction of nitrate of silver from imperfectly washed prints; possibly, touching it with fingers which have been in contact with hyposulphite of soda.

C. B. P.—The negatives you forward are fogged. It is probable that the addition of a drop or two of nitric acid to your bath will remove the fogging. Should this fail, add a few drops of 10-grain solution of carbonate of soda to the bath, just sufficient to make it remain turbid; then expose the solution to the sun for a few hours; filter, and then try a plate; it may possibly work clean at once, or it may require a drop or two of acid. Sometimes the addition of a few drops of tincture of iodine to the collodion, just sufficient to make it a sherry colour, will prevent fogging. It is probable, also, that diffused light reaches the plate, either through the lens or in the dark room. 2. You will find intensifying formulæ in your copy of the YEAR-BOOK when you receive it. 3. The formula you mention is not good; you will find a better in the YEAR-BOOK. 4. For winter, add 12 ounces of water to an ounce of nitrate of silver; for summer bath, 15 ounces. 5. You may make a hood, to protect your lens from diffused light, of cardboard; it should be cone-shaped, extending about a foot in advance of the lens, and the inside should be painted black. 7. It entirely depends upon the effect you desire, as to whether you shall select sunshine or diffused light for photographing a building. You may get a good evenly-detailed picture in diffused light; but if you want more artistic effect, sunshine is best, but the effect of light and shadow must be carefully chosen, and the photography must be good. Study your building in sunshine and diffused light, and examine the various effects. 8. The YEAR-BOOK is published at the NEWS Office, price 1s.

INQUIRER AND CONSTANT READER.—It is almost impossible to vignette satisfactorily with vignette glasses. Each picture requires a special shape of aperture and degree of gradation suited to itself. Many of the best photographers use a piece of card with an aperture fringed with cotton wool, made to suit each picture. Some use the vignette glasses, supplementing the aperture they possess with cotton wool.

AMATEUR E.—We know of no method of rendering a photograph imperishable, except burning-in, and for this purpose it must be produced in enamel colours. There are various methods of doing this; but unless you have worked in this direction you had better send your negative and instructions to some one who understands such work. M. Joubert, of Porchester Terrace, Bayswater, is the patentee of one process, and Messrs. Marion are the agents for another process of this kind. We do not know of any pottery where such work is done.

J. CURTIS.—The dissolving of the film in the case you describe was, probably, due to the character of the collodion, which was soluble in strong alcohol. It sometimes happens that samples, excellent in other respects, have this fault. The only mode of dealing with such is to avoid a spirit varnish, using a chloroform of benzole varnish instead; or, before applying a spirit varnish, give the film a coating of dilute albumen or gum water whilst it is wet, and when dry the film will be protected from the solvent action of the spirit. 2. Mr. Blanchard's developing box is one of the most convenient we know for wet plates. It has been described in our columns.

W. MCCREE.—We are aware that Mr. Archer subsequently published another edition of his little work, containing the results of further experience. But our business was with the process in its infancy, as a means of estimating its progress and growth.

JAMES DALE.—For card work, the No. 2, decidedly. The No. 4 is of much too long focus for working cards with any degree of convenience: it is intended for whole plates. Mr. Williams uses the 2, not the 4, for card pictures. You need not desire anything quicker or better in all respects.

N.—Thanks for the diagrams and full description. We will take an early opportunity of placing the plan before our readers.

A POOR PHOTO.—The marks on your plates are not due to either collodion or bath, but appear to be the result of splashes of some kind, but how caused, we are uncertain. They have the appearance of splashes upon the finished negative, but they might possibly be the result of splashes upon the cleaned plate, or of splashes of silver solution caused by the shutting down of the slide with a jerk: they are, however, not like the splashes usually arising from the latter cause.

DEVELOPER.—The white markings like frosted silver, on your negatives, arise from partial drying of the plate at these spots before the developer is applied. Certain conditions of the bath are more conducive to the production of this effect than others; the presence of organic matter, for instance, and too close an approximation to neutrality. The opaque stains at the end arise from the drainings of the plate, which have come into contact with the inner frames of the dark slide. To prevent the plate drying, place a piece of moist blotting-paper at the back of the plate, and to prevent the drainings causing stains, let the plate rest on pieces of blotting-paper. See also that the bath is in good condition. 2. The spots of which you speak in the albumenized paper are, probably, metallic spots in the original paper. We find no print enclosed in your letter.

ST. DENNIS.—We are not familiar with the coloured work of some you name but have seen good colouring from the establishments of No. 5 and No. 3.

C. C. BELGIUM.—The photographs received are all pretty good, but you must beware of a slight tendency to under-exposure. 2. Good reproductions of engravings produced in a systematic series would, probably, sell, but not as isolated and odd copies. Prices vary so much that we cannot offer an opinion on the subject. 3. The margin of the mounts is much too narrow to produce the best effect. It should be two or three times as wide. 4. Our publisher will effect registrations for you, if you send him the form properly filled up, and fifteen penny stamps. You cannot secure a copyright in your copies of engravings. 5. The equivalent focus of the new compound stereo lenses, regarding which you enquire, is 4 four-tenth inches. 6. Blanchard's manipulating chamber of those you name. We presume that where advertisers do not mention prices, it often happens they are fluctuating.

T. F.—There is no reason why your communication should not appear. We shall have pleasure in publishing it.

CHILDREN'S PORTRAITURE.—M. Taglio Cozzo explains, in reference to his recent letter on this subject, where it says, "'Use a binocular or shifting front, and *try another plate*.' I wish it to read, *try another exposure*. In fact, it is to avoid trying another plate that we expose one corner of the plate at the time. Also, where it says, 'double portrait,' it should read, 'doubled portrait.' I mean, double outline of the picture."

J. L.—From the evidence we receive from time to time, fuming the excited paper is a decided advantage, giving great richness and depth of tone. Several of our correspondents use it in conjunction with the nitrate of soda bath. We believe Dr. Van Monckhoven uses both in producing enlarged prints. Both these adjuncts to the printing process were first published to English photographers in our pages.

W. H. HARRISON.—The chief difference between the lenses of the two makers you name is, that those of the English maker are more rapid, and have a flatter field. In a recent trial of two similar lenses, by a continental photographer of the highest standing, we understand that those of the English maker gave the same results, under the same conditions, and in the same subject, in seven seconds, which the continental lens did in ten seconds. 2. Mr. England albumenizes his own paper, using five grains of chloride of ammonium and five grains of chloride of barium to the ounce of albumen. He uses a 40-grain nitrate of silver bath, containing a little alcohol: and tones with chloride of gold just neutralized by carbonate of soda. 3. Mr. Elliott, of Aldermanbury Postern, is the maker of Blanchard's developing box. We don't know the price. 4. Mr. England uses his own collodion, and uses nearly equal parts of bromide and iodide. 5. Chloride of calcium will have altogether a different action to hypochlorite of lime. 6. There are so many rolling presses cheap and good that we really cannot undertake to recommend any especial one. 7. You will see that many modifications of the carbon process have been made during your interregnum of NEWS reading.

J. P. S.—You have too much front and top light, and a slight tendency to under-expose and over-intensify. Your best mode of ascertaining the probability of your obtaining a situation as assistant operator is to insert an announcement in our advertising columns, stating your wishes. The commencement of a season generally presents better chances of obtaining engagements than the close. Salaries vary very much; we cannot give you any idea of what you might probably obtain.

A. F.—We do not consider your cards of a bad tone, although they might be a little deeper in colour with advantage. To secure this, print a little deeper and tone a little deeper. Some samples of paper lose a great deal in fixing; and in such case the only plan is to allow for the loss, or else use another sample of paper.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. F. W. EVANS, 246, Old Kent Road, S.E.,
Two Photographs of Vincent Robert Burgess, Esq., Grand Master Independent Order of Odd Fellows, Manchester Unity.

MR. PRYCE JONES, Regent Street, Wrexham, Wales,
Photograph of Llew Llwyfo, the Welsh Bard.

MESSRS. HOLDERNESS AND HIGGINSON, 36, Charlotte Street, Preston,
Photograph of the Right Rev. Dr. Goss.

MR. JAMES ARMSTRONG, Mechanics' Hall, Carlisle,
Photograph of the Mayor of Carlisle and Shakspeare.

MR. STEWART MCWATTERS, Graham's Road, Falkirk,
Photograph of Remains of the "Charlotte Dundas,' the first Steamboat, as it lay in the Forth and Clyde Canal, 1860.

MR. J. H. KAY, 57, Argyle Street, Glasgow,
Photograph of Rev. John Macfarlane.

MR. J. SMITH, 8, Pool Valley, Brighton,
Photograph of Rev. J. B. Figgis, M.A.

A. G. TOD, 2, North Parade, Cheltenham,
Photograph of Sir Walter Scott, from Bust in the possession of the Family, by Sir F. Chantrey.

MR. A. GOODCHILD, Redcar,
Two Photographs of Right Rev. Lord Bishop of Columbia.

MR. J. PATRICK, High Street, Leven,
Photograph of Bishop Wordsworth, St. Andrew's.

MR. GEORGE ROBERT FITT, 100, Quadrant, Regent Street,
Photograph of Sir James Ranald Martin, C.B., F.R.S., Physician to Indian Council.
Photograph of Dr. G. Owen Rees, F.R.C.P., F.R.S. Physician Guy's Hospital.
Photograph of Dr. Charles Murchison, F.R.C.P.
Photograph of Dr. Benj. Guy Babington, F.R.S., F.R.C.P., President of Epidemiological Society.

MR. P. C. STOATZ, 66, Bold Street, Liverpool,
Four Photographs of Captain Semmes.

MESSRS. PETTIT BROTHERS, 30, Paradise Street, Birmingham
Glass Stereograph of Wordsworth's House.
Glass Stereograph of Rydal Church.
Glass Stereograph of Frozen Stream.
Glass Stereograph of Winter's Jewellery.
Glass Stereograph of Ice Boughs.
Glass Stereograph of Frozen Drops.
Glass Stereograph of The Otter's Cave
Glass Stereograph of Rydal Fall.
Glass Stereograph of Icicles.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 315.—*September* 16, 1864.

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A NEW WET PROCESS WITHOUT A NITRATE BATH—TANNIN AS A SENSITIZER.

WE are about to bring before our readers a new wet collodion process, in which we dispense with the use of a nitrate of silver bath, and which, from the experiments we have already made, promises to be at once simple, practical, and efficient. Taking up some experiments we carried out three or four years ago, in which we combined the salts of silver in the collodion, instead of forming them on the film by double decomposition in the nitrate bath—abandoned at that time, because no advantage was gained—we now avail ourselves of Poitevin's discovery, that tannin is a sensitizing agent, to give a new character to the process, and by dissolving iodide and bromide of silver in collodion, and then immersing the coated plate in a solution of tannin, produce a sensitive plate without any free nitrate. Before proceeding further, however, we may briefly glance at the history of such processes.

We are often reminded by the course of events in the progress of photography of the old paradoxical adage, that there is nothing so new as that which is old. But it often happens, that the revival of the old, and, in its day, impracticable, initiates, under new conditions, and practised in new light, something which may become both practicable and useful. A communication in a contemporary by Mr. B. J. Sayce, and W. B. Bolton, on photography without a nitrate bath, reminds us of this truth, and is worthy of a few remarks.

How early experiments for dispensing with a nitrate of silver bath first commenced, we cannot at this moment state; but we know that they have from time to time during some years sprung up into fresh attention. It is not surprising that such attempts should frequently have engaged the energies of experimentalists. The idea of dispensing with the nitrate bath, is a peculiarly attractive one: to the nitrate bath the photographer attributes, and with much justice, by far the largest share of the troubles which beset him in his operations from time to time. It is the only material he uses, which, in the nature of it, is never in the same condition for two plates. It is perpetually changing its constitution. A stable collodion may remain in the same condition for weeks; and the coating of one plate is precisely the same in constitution as was the coating of the last, and as will be the coating of the next. The developer applied to one plate is just the same as that applied to the last. Absolute uniformity of condition is easily secured here, and in many other of the preparations used. But in the nitrate bath, each plate immersed changes the conditions. A certain amount of silver is removed in the form of iodide and bromide, and a certain amount of some other base—potassium, ammonium, cadmium, or something else—is left in its place, together with some trace of alcohol and ether, and possibly other matters. Fog, stains, streaks, pinholes, &c., are the frequent consequences and evidences of these changing conditions, and the notion, therefore, of combining in one solution, the sensitive salts of silver direct, instead of other salts, which by double decomposition in the nitrate bath shall form the sensitive film, is naturally very seductive, and has frequently engaged attention.

Early in 1860 M. Poitevin described a process of producing a negative without using a nitrate of silver bath. Two per cent. of nitrate of silver was added to plain collodion, and the plate was coated with the preparation. A solution of iodide of potassium, nearly saturated with iodide of silver, was then poured over the plate, which was then washed and dried: the plate in this state was insensitive to light. When required for use, a solution of nitrate of silver was poured over the plate, which was then exposed and developed in the usual way. Later in the same year, M. Bellini published in our pages an account of some crude experiments in which iodide, bromide, and lactate of silver were combined in one preparation, a spirit varnish being the vehicle in which they were held to form the sensitive film. In the ensuing spring, Mr. Edward Smith, of Bath, sent us a letter, accompanied by some specimens, referring to some experiments for a similar purpose. About the same time Captain Dixon and Mr. Samuel Fry engaged in some similar experiments. Captain Dixon met with sufficient success in his early experiments to induce him to enter a provisional specification at the patent office, with a view to protect his discovery. It consisted in adding nitrate of silver to iodized collodion, exposing, and developing with pyrogallic acid. We have prints before us now, produced from the negatives then obtained, and the prints give evidence of a considerable amount of promise. We have no details of the exact proportions or manipulations employed.

About the same time, April 1861, we made a series of experiments with the same purpose, and we have now in our possession some of the negatives produced. The plan we adopted was to prepare various samples of bromo-iodized collodion, containing the mixed salts in various proportions, averaging about four grains to the ounce of collodion, to which was added alcoholic solution of nitrate of silver sufficient to give about six grains to each ounce of the collodion. This was kept in an opaque bottle. A plate was coated and exposed at once, and then developed either by pouring on an alcoholic solution of pyrogallic acid containing a few drops of a solution of nitrate of silver, or by plunging the plate into an aqueous solution of protosulphate of iron, containing a few drops of nitrate of silver. The experiments were not proceeded with, because no advantage over the wet process was obtained, whilst in some respects there was a loss. The defects were, a little less sensitiveness than wet plates, and a disposition to fog. The latter defect was removed by adding a little iodine to the preparation, but this decreased the amount of sensitiveness. We find a record that a plate

exposed during a dull light with a Dallmeyer's No. 1 B portrait lens with a three-eighths stop, required forty seconds, and gave a negative full of detail, but wanting in vigour.

The experiments of Messrs. Sayce and Bolton, described in a contemporary, to which we have referred, have been directed to the production of dry plates with a tannin preservative. Three grains of bromide and four grains of nitrate of silver were dissolved in an ounce of collodion; a plate was coated, and then immersed in water, until all greasy appearance had vanished. A fifteen-grain solution was then poured on the plate, which was then drained and dried. With the alkaline development similar to that applied to tannin plates, a negative, described as full of detail, sufficiently dense to print, and perfectly clean, was produced, with an exposure of about two or three times as long as that required by a wet plate.

So far there is, perhaps, little practically gained. With the exception of saving one step in the process, that of immersing in the nitrate bath, the manipulations are the same as those usually employed in preparing tannin plates, and the exposure is not less, rather a trifle more, than that with which skilful tannin operators obtained good results by the ordinary process and alkaline development. The gentlemen making the experiment state that they have not yet had opportunity of testing the keeping qualities of the collodion containing the sensitive salts; but we mention, that in our former experience with a similar compound, we found the keeping qualities to be unsatisfactory if any excess of nitrate of silver were present. A decomposition slowly set in, the collodion finally darkening and throwing down a curdy precipitate.

Nevertheless, if the experiments just detailed are verified by general practice, we consider that a most important step is gained, and that further progress is possible. The great desideratum is a process which shall give results as rapid and excellent as the wet process, but dispense with the use of a nitrate bath. We have seen from former experiments, that whilst plates could be so prepared, they were inferior in sensitiveness and excellence of result to ordinary wet plates. The question arises then, are we any nearer solving the problem than we were before? We believe, for various reasons, that we are, and a few hasty experiments have confirmed us in this view. Certain discoveries in the chemistry of photography have been made since that time, and it is probable that these discoveries may be made to bear intimately upon this subject.

Some twelve months ago M. Poitevin announced his discovery, that tannin really acted as a sensitizing agent, and might in some cases be made to act the part of free nitrate of silver. Shortly afterwards, Mr. Sutton placed this subject in a practical form, by describing a process in which wet plates were thoroughly washed when removed from the nitrate bath, treated with tannin, and then exposed and developed by the alkaline method. Some of the negatives produced by this method, which we had an opportunity of inspecting, were excellent in quality, being clear, rich, and vigorous; but in that process the nitrate of silver bath was still used, and the manipulations were increased rather than reduced.

We now propose to render the qualities of tannin, as a sensitizing agent, available in producing perfect wet plates, without the use of a nitrate bath, proceeding as follows:—In the first place make an alcoholic solution of nitrate of silver, the amount which will be dissolved will vary with the strength of the spirit—we believe ordinary rectified spirits will dissolve about fifteen grains to the ounce; but this question, and various details connected with it, will be best settled by experiment. Then take good bromo-iodized collodion, and sufficient of the silver solution to convert the whole of the salts in the collodion into bromide and iodide of silver, but without adding excess of nitrate. Now plunge the plate into a dipping bath containing a twenty-grain solution of tannin. After remaining there a minute or two the plate will be ready for exposure, after which, and washing away the excess of tannin, it may be developed either by the alkaline method, or by ordinary pyrogallic acid development. In our experiments we have satisfied ourselves of the value of tannin in this process. A plate coated with the collodion containing sensitive salts gave, after prolonged exposure, a thin phantom image, with either iron or pyrogallic acid development. A plate coated with the same preparation had then one-half coated with a ten-grain tannin solution, and the other left as it was. After exposure, as for a wet plate, scarcely any trace of an image was visible on the half containing the collodion with bromo-iodide of silver only, whilst the half which had been coated with tannin possessed a fair amount of detail and vigour. This was developed with pyrogallic acid. Our time for experiment has, however, as yet been limited, and we are not in a position to state the formula which will give the best result.

There are several suggestions which occur, however, as important in regard to further experiments. In the first place the mode of preparing the sensitive collodion may be improved. Instead of mixing in the collodion certain iodides and bromides with nitrate of silver, and so producing by double decomposition the sensitive salts of silver, plus certain inert or possibly injurious nitrates, it will probably be much better to prepare bromide and iodide of silver, and dissolve them in the collodion. If Major Russell's theory be correct, that a little unchanged bromide prevents fogging in an ordinary tannin plate, it may be that the same thing will be beneficial here. In any case it is tolerably certain that if a little iodide of potassium be added in excess, the collodion will keep indefinitely, even in the light, and it is possible that with tannin as a sensitizer, the presence of the alkaline iodide may not be injurious. If experience teach that the presence of a trace of free nitrate is desirable, it can easily be added to the collodion, to be used from day to day. We observe that in the dry process described in our contemporary, the plate is washed before applying the tannin: this appears to us to be unnecessary; the plate may be plunged in a bath of tannin as soon as the film is set.

In regard to the collodion we may observe that it should be a tough sample, as the film appears to be much more easily disintegrated than one which has been excited in a nitrate of silver bath. We have found a mixture of bromide and iodide better than either alone. In development, if the alkaline method be used, a weak solution of carbonate of soda or ammonia may be poured on to the plate without removing the tannin; but we fancy cleaner results are produced if the plate be rinsed before development.

It is possible that plates prepared with bromide and iodide of silver in this way, may be permitted to dry, and kept in the unsensitive state, and then rendered sensitive for use when required by means of a solution of tannin.

We regret that the limited experiment we have been able to make since this idea occurred to us, has only enabled us to verify the principle without establishing the least details and formulæ. As our time for further experiment is curtailed by the meetings of the British Association at Bath, at which it is necessary we should be present, we prefer to give the process in its crude form to our readers, that it may be submitted to the experimental tests of those interested in the matter, rather than delay its publication until we shall be able to resume our own experiments.

We may remark, in conclusion, how singularly connected by a regular chain is the process of discovery in photography: how dependent is every inventor upon the labours of those preceding him; and how difficult, with propriety, it is to trammel progress by patents. Three or four years ago, we abandoned experiments for dispensing with the nitrate bath, not because the thing was impossible, but because no advantage was gained. Since then Major Russell produced the first link in a new chain of discovery in publishing the value of tannin as a photographic agent. M. Poitevin discovered that the efficiency of tannin really consists in its being a sensitizer. Mr. Sutton puts this discovery into operation, by working out a practical wet process, based upon

it. Messrs. Sayce and Bolton render it available as a dry process, in which the old idea of containing the silver salts in the collodion is revived. And in the new wet process we now give to our readers, the suggestion of all the former experiments is embodied.

Since the above was in type, just as we are going to press, we have received from Mr. Sayce a communication on his dry process, and a print from one of the negatives, which is perfectly clean and brilliant, and illustrates the excellence of the process. We extract from his letter the following hints as to the best mode of working so far as present experience indicates :—

The collodion which, up to the present time, I find gives best result contains, pyroxyline 2 grains, bromide salts 6 grains, nitrate silver 8 grains; the plate is coated, allowed to set in the ordinary manner, and *without* preliminary washing placed in a tank of water, until the number required are coated with collodion.

They are then just rinsed in a dish of water, and tanned either in a dish or by pouring over. Dried in the most suitable manner, exposed a trifle longer than a wet plate, and developed with carbonate of ammonia and pyrogallic acid.

The washing I regard as merely rendering the film porous, and in a few days hope to accomplish this result without *any* washing.

ENAMELLED PHOTOGRAPHS.

There are two things in regard to positive prints, which photographers have always desired: some means of obtaining a finer and more delicate surface than that of paper, so that all the delicate detail possessed by a negative might be fairly rendered; and some means for preserving the richness and transparency which the print possesses whilst in the washing water, but which in a great measure disappears when the surface has become dry. The constant demand for more highly albumenized papers, the proposals for various kinds of varnish for prints, the introduction of the enamelled papers a year or two ago, all illustrate the demand for an improved surface, but none of the methods introduced have been regarded as quite satisfactory or free from drawbacks.

We have recently received from Mr. Squire some examples of photographs with by far the finest surface we have ever seen. The surface is as fine as the most perfectly polished glass, and the pictures seem to possess an amount of delicacy, detail, and richness, such as we rarely see. We learn, however, that these are ordinary albumenized paper prints treated with an enamelling preparation, which gives this marvellous result. We find the surface hard and unaffected by moisture, and polished like a mirror, whilst the shadows of the pictures have all that peculiar transparency and richness which we only observe whilst the prints are wet, and which as we have observed generally disappear when they are dry. As the only information which accompanied the prints was that the fine surface was due to a patent process which has been some time in existence, but only now about to be introduced to photographers, we proceeded to examine them carefully, with a view to ascertain the possible modes by which such a result could be produced.

In many respects we found the result to resemble that of the coating of gelatine applied to the surfaces of prints, &c., on *bonbon* boxes, manufactured in France; but it had the material difference that it was harder and unaffected by moisture, which at once spoils the gelatine surface. As the process by which this coating of gelatine is applied possesses an interest in connection with this subject, we will repeat it here. To twenty grains of the purest gelatine—Italian gelatine is said to be best, and isinglass the worst—add an ounce of cold water: place it near a fire, until it is dissolved, and then strain. A piece of flannel will be found the best for straining, and will give a pure clear solution. Provide a piece of well-polished plate-glass, free from scratches and imperfections, of the required size. After cleansing thoroughly and drying, sponge all over with fresh ox gall. Before the ox gall is dry, pour on it sufficient of the hot solution of gelatine to cover the plate in the same manner as collodion, and put it away to set where it will be free from dust. The time required for setting will depend on the temperature, varying from half-an-hour to a few hours. When it is sufficiently set—which may be ascertained by gently laying a finger on its surface, which should just retain the impression thus made, without adhering — lay the paper, previously damped, gently on the gelatine, face downwards, pressing it, and taking sufficient care to avoid air-bubbles, which may be pressed out with a paper-knife when they occur; then leave it some hours to harden thoroughly. A penknife may then be run round the edge of the plate, when the gelatine is perfectly dry; it will, if the process has been properly conducted, separate from the glass with ease, and present a highly polished transparent surface.

The surface so prepared will, however, be easily affected by moisture, damp fingers leaving a very unpleasant impression thereon. It was clear, therefore, that the pictures we had received, had received some other treatment. We then remembered that our German correspondent, Herr Liesegang, Editor of our esteemed contemporary, the *Protographische Archiv*, had described in one of his letters, published some three or four years ago in our pages, a method of supplementing the preparation just described by a surface of collodion, which protected the gelatine from moisture. The process was the same, only the plate of glass was coated first with collodion, and then with gelatine. This process gives a very similar result to those before us.

On further inquiry, we learn that the patent process is really of an analogous character to that just described. The patent under which it is protected being, however, of an anterior date to our publication, and therefore comprehending it. The patent was obtained by Stephen Barnwell and Alexander Rollason in the year 1860: its claims are most comprehensive, and include the combining of solutions of pyroxyline with animal, mineral, and vegetable substances, and then used for a variety of purposes, amongst which is included the producing of varnished surfaces, by spreading the compound on a plate of glass, the paper or textile fabric being then applied and attached by pressure.

We are uncertain what are the exact materials used in the patented preparations; but the first coating is of course collodion, of a quality giving a very tough and transparent film, well suited for varnish purposes. The second coating is probably some modification of the gelatine solution we have given, and is undoubtedly in some respects superior. The gelatine preparation has, in our hands, given a surface somewhat inferior, and a texture considerably less pliable and more apt to crack, than we find in those by the patented process.

Instead of restricting the use of this method of finishing the pictures to licencees, Mr. Squire has, very wisely, we think, resolved to place no restriction upon its practice whatever, merely obtaining his remuneration by the sale of the materials. Photographers are rightly, or wrongly, impatient of patent trammels to the practice of any branch of their art. Many photographic patents which have been obtained have not had well grounded claims, and the photographer has almost come to regard any patent as an infringement of his natural rights. Where, however, a patentee confines his claims to the right to manufacture materials, without imposing an additional payment on the photographer as a condition of the employment of such materials, few photographers will object to the condition. Mr. Squire contemplates providing the means of applying the material in two or three forms: in solutions, with instructions for use; on plates of glass ready for receiving the print to be enamelled; and in sheets packed in books like gold leaf, ready for application to the prints to be treated. Of the prices we know nothing, nor do they concern us here.

One word in conclusion as to the proper sphere of this mode of finishing pictures, and as to the mode of manipulating. Wherever a highly glazed surface is admired, or wherever the possession of very great delicacy of gradation

is important, such a mode of finishing a picture will be useful. For card pictures, and for stereoscopic slides especially, the result will be very valuable. Paper slides do not admit of the use of a very powerful lens in a stereoscope, because the textnre of the paper becomes so offensively magnified; but with this coating snch a defect disappears entirely, and the result of the paper slide is almost equal to that of transparency on glass. For large pictures we do not think the effect desirable: we prefer, in truth, as we have often said, plain paper, where sufficient brilliancy can be obtained, and regard a glazed surface as tending to vulgarity. In manipulating with the solutions it is important, in the first place, to have a well-cleaned piece of plate glass. This is then coated with the proper quality of collodion, which is suffered to dry; the next preparation is then warmed, and the plate is warmed, the preparation then being poured on the collodion, the whole is suffered to set and dry. About a ten-by-eight plate will be found a useful size, and will permit a number of prints to be mounted at once. The best time for mounting is when the print has just been taken from the last washing water and blotted off; but if the print have been dried, it will be better first to trim it round the proper size for mounting, and then, damping it thoroughly, place it, face down, on to the prepared glass, and placing a sheet of paper over it, proceed to rub it down well. It is very important now to secure perfect contact, and avoid minute air bubbles.

By turning over the glass and examining the face of the print, all bubbles may be seen, and care must be taken to press them quite out. A piece of bone or ivory with straight edge will aid in effecting this operation. If minute bubbles be left, they materially spoil the result. If the print be not sufficiently damp, it will be difficult to secure perfect contact.

By a most singular coincidence, just as we had concluded these remarks on enamelling photographs, and had jotted down the few hints on manipulation derived from our own experiments, we have received from Mr. Tunny, of Edinburgh, a communication containing most complete instructions for a method of enamelling, which he has employed for a long time past. How far his process will interfere with Mr. Rollason's patent, or the patent will interfere with Mr. Tunny, we cannot undertake to say: but it is certain that the print Mr. Tunny kindly encloses as illustrating his process, is as perfect in surface as it is possible for anything to be, giving the greatest richness, delicacy, and brilliancy to the print.

MODIFICATION OF THE CARAMEL PROCESS.

THE modification of the albumen process, by Captain Bonamy, suggested to me that a clean and certain process could be obtained by a similar modification of Mr. Bartholomew's caramel process: and such is the case; what I am about to relate may be done with perfect success with dilute albumen. The many persons who try, and abandon photography on account of stains and failures, if they would attempt what I am about to relate, will have no cause to complain of want of success. Let them, if they please, make a bromo-iodized collodion with the best alcohol, and the best ether of the formula No. 1. (p. 21), of Mr. Heisch, mentioned in his "Elements of Photography," namely, 30 grains of iodide of ammonium, and 10 grains of bromide of ammonium as the iodizing solution of the collodion; after coating the plate and sensitizing it in the ordinary manner, proceed thus:—First, wash the plate in distilled water, which I do by putting it into a well-bath for twenty or thirty minutes, then flush it with distilled water. Secondly, to 4 ounces of distilled water, add 60 grains of iodide of ammonium, and 20 grains of bromide of ammonium, and to this solution add as Mr. Bartholomew proposed for his caramel process, drop by drop of caramel until the solution is of a dark brandy colour. This makes a preservative solution; with this solution flood the plate, and pour it off and on the plate, and dry. Thirdly, I have an acid nitrate of silver solution well-bath. When a plate prepared as above mentioned is to be used, dip it for six seconds in this bath, and be careful immediately to wash the plate well—do not fear the washing—and dry it. After the plate is exposed, develop with pyrogallic acid and acid silver. It is a process which requires a long exposure: for a distant landscape, say, ten to twelve minutes. It gives a clean plate, developes well, and the exposure is the same as for an albumenized plate, but caramel will be found to be an easily obtainable substitute for albumen; though albumen diluted with the above-bromized and iodized water solution does as well. Persons who desire to practise photography, and do not object to what is called "a slow and sure process," will not be disappointed if they use caramel or dilute albumen in the manner suggested. Also, they will find their work much simplified if they will begin by having as a necessary part of their apparatus at least three well-baths. I have four such baths—one for the usual nitrate of silver bath, two containing distilled water, in which I successively place the plates in washing after sensitizing them, and the fourth contains the acid silver bath. I claim no novelty in these suggestions. T. F.

HOW TO ENAMEL PHOTOGRAPHS.

BY J. G. TUNNY.

A SHEET of glass is cleaned and coated as an ordinary collodion plate, only the collodion is uniodized and rather of the tough than the powdery quality. An ounce of gelatine, having been soaked for a few hours in twelve ounces of water, is now boiled in an earthenware jar, and the white of an egg added to it to clarify it. It is now filtered while warm through a piece of flannel. The gelatine is now ready to coat the collodionized plate, which is done by pouring sufficient on the centre of the glass and carrying it to the edges by a slip of paper. After moving it to and fro for a few seconds, it is drained into another vessel, so that it may be used again, but it must not be returned to the stock jar, as it may carry dust with it. Any number of glasses can be prepared in this way. As they drain, lay them on a level bench or table.

After they have set so as to feel a little "tacky," take your prints, which have been thoroughly washed, lift them from the tray of pure water, and lay them immediately on the prepared plate; this is best done by lifting the print in a horizontal way, letting the edge of the print fall on the edge of the glass, and by a gentle pressure let the print gradually come into contact with the glass; the water will flow before the print, which entirely prevents the formation of air bells. The prints can be also put down dry, but the chances of air bells is much greater.

Eight "cartes" can be laid down on a plate 12 × 10. I find it better just to lift the "cartes" from the water and lay them down as described. For some large sizes, I have found it very easy first to lay the glass on a levelling stand, then cover the gelatine with as much water as it will carry, lay the print thereon, which will float; take hold now of two corners of the glass, pressing with the thumb the print into contact with the gelatine; lift the glass gently to an angle; the water will flow off, leaving the print in perfect contact, and generally without an air bubble; but if there should be any, they are easily seen by looking at the opposite side, when a gentle pressure of the finger will lead the bell to the side. When dry, which generally takes about eight or ten hours, they can be separated by passing a knife round the edge of the glass and lifting the whole. Then mount in the ordinary way.

I prefer, when it is possible, having the prints all trimmed before laying them down on the glass, so that I can paste the back of the print and lay the board on before removal from the glass; by this mode, the surface is much more perfect than when the print is removed and then mounted.

For lockets and "cartes" I have found the above process produce exquisite delicacy.

HOW TO OBTAIN A STRONG NEGATIVE FROM A WEAK ONE.

Photographic portraiture has made great progress of late years. The general processes of manipulation have been only slightly modified, yet the difference observable between proofs obtained at the present day, and those of distant date, is very great. Photographers tend more and more to justify the title of *artist*, that has been frequently ill-bestowed, but which we think cannot be much longer denied, if they continue to pursue the path which a certain number have entered upon so successfully.

The object of the æsthetic studies of the photographer must be the discovery of beauty in the actual and real. The thing essential to the production of good photographs is the appreciation of the beautiful. When the photographer clearly understands what it is he desires to obtain, the practice of the operations will permit him to realize, in a certain measure, what he has conceived. But often, very often, the process disappoints the artist, and the sensitive plate gives only a pale translation of the model suitably posed and lighted.

The daguerreotype reproduced the model much more exactly than the collodion negative. We could also obtain portraits upon silvered plate in a painter's studio, from a model properly lighted and posed before an easel, while under the same conditions of lighting, the collodion plate gives bad results. The artistic photographer must strive to diminish the difference between what he sees and what he obtains as a final result. Supposing the model to be well lighted, this will consist in a suitable strength in the developer or intensifier, and in the judicious employment of this latter agent the chief element of success will frequently be found.

At first, the model was too strongly lighted, and the intensifier was greatly abused: the results of this mode of operating were deplorable. The visage of the portrait consisted of a white spot, upon which were blotted a pair of eyes, a mouth, and sometimes the shadow of a nose. Now, skilful operators manage the intensifying so carefully as to preserve the half-tones; they understand that the desire to break up the deeper shadows must never lead them to sacrifice the lighter tones, without which the visage will lack relief.

The operation of intensifying permits the photographer to seek, like the painter, a portion of the effect during the process. But the photographer has not the faculty of retracing his steps when he has exceeded the aim he desired to attain. While strengthening a negative proof, he finds himself between two rocks; and if he aims at producing truly artistic works, it must often happen that he will obtain negatives rich in detail, but too weak to yield good positive proofs.

In general, professional photographers find it advantageous to abuse the intensifying in ordinary work; reckoning upon the intensity of the positive printing to restore, in part, the half-tones. Besides, it must be confessed, the bad taste of a portion of the public impels them in this direction. Ladies, of a certain age, desire that their portraits should make them look, at least, fifteen years younger. This is easily done; fifteen seconds too much intensifying—that's the prescription.

From what has been stated above, the utility of a process by means of which we can obtain a vigorous negative by employing a weak negative, even when this latter has been varnished, is fully established.

When we have command of the model, and the first negative is unsatisfactory, the best plan is to take another. We can ask Madame A or Madame B to sit a second time, and they will make no difficulty; but if it be a princess, or one of the queens of the stage, it is quite another affair.

Recently a photographer came to consult me as to the means by which he could print good positives from a negative of one of these queens of the stage, in very scanty costume. This negative would have possessed considerable commercial value had it not been so weak. The positive proofs obtained from it, even when printed in the shade, the frame covered with a sheet of white paper, presented no relief; they were quite unsaleable.

We suggested the following methods founded upon theory, and the efficacy of which was completely demonstrated in practice. The weak negative having been placed in a *camera with conjugate foci*, a proof was taken of it by employing pyrogallic acid as a developer, and the same acid, with the addition of nitrate of silver, for intensifying: the developer and the intensifyer containing a strong proportion of acetic acid. We thus obtained a transparent *positive* much stronger in tone than the negative. This positive was placed in the anterior frame of the camera with conjugate foci, and a negative taken from it, presenting all the detail of the first negative, with the same delicacy, and much greater contrast between the lights and shades. This negative gave positive proofs which left nothing to be desired.—*Bulletin Belge de la Photographie.*

ÆSTHETICS OF PHOTOGRAPHY.

Being Short Lesson in Photography, No. 27.*

The reader must guard against supposing that the distortion alluded to in the last lesson was owing entirely or principally to the spherical aberration of his lens; for it will be found to exist even in the best corrected combination, and is owing mainly to the obliquity of the rays as they enter the lens, and to the different distances of the various parts of the portrait to be photographed.

Suppose, for instance, the eye of the model be accurately in focus in the centre of the ground glass:—

1st. This being done and the model remaining quite still, rotate the camera slightly, so that the eye is now brought to the position *E* or *W*, it will be evident that the same sharpness no longer exists as when first focussed in the centre, The reason of this is, that the pencil of light, which enters the lens, enters quite *obliquely* to the axis, and has its conjugate focus *not* in the plane perpendicular to the axis, that is, *not upon the ground glass*, but in a position in advance of it, or between it and the lens.

2nd. Instead of rotating the camera, draw it half an inch or so backwards, thus increasing the distance between the model and the lens. We find in this case a similar effect as in the first instance; the sharpness in the eye has vanished, and, in order to restore it, the ground glass and the lens must be brought nearer together.

The defect, therefore, in both cases, is of the same nature, and requires the same mode of correction.

From this analysis we are taught a *third* method of overcoming the distortion of portraiture, which consists in arranging the model in such a form as that each part (each essential part) shall lie in a curved concave towards the lens. For instance, suppose the model be in a sitting posture, then the body must form in some measure a semicircle, so that the head and the feet shall be nearer (*slightly nearer* to the lens) than the central parts, in order to compensate for the two causes of error—obliquity of the outside rays and the different distances of the different parts.

Unless this semicircular compensation be made, that is, supposing the sitter is fixed bolt upright with his head against the rest, and his feet either directly in front, or to the east or to the west, the different parts of the model will lie at very variable distances from the lens, and cannot possibly be brought into focus on the same plate. The majority of the parts, therefore, will be out of focus, and, being out of focus, they will be both magnified and indistinct.

There is no wonder, then, that there is frequently something so unnatural about our friends' portraits: the *principal points were equally in focus on the ground glass.*

The ignorant operator, unable to satisfy his customers, and not knowing the cause of his failure, is apt to lose his

* From *Humphrey's Journal.*

patience, and to attribute his want of success to the Almighty in the manufacture of such a cramped, distorted sort of architecture. "For," says he, "the lenses are not artists, they do not construct beauties where none exist, they are mere copyists and faithful transcribers of ugliness as well as charms. I am sorry the Lord did not make you exactly to your liking." There are such operators. It is a pity they did not keep to the plough. Where a number of portraits are to be exhibited in the same picture, the difficulty of adjusting so many figures in focus is more than proportionately increased; but the same rule holds good in every instance: fix upon the most vital points in every case, and arrange those points along the concavity of a curve, of which the lens is, as it were, the centre. In order to do this, focus in the first place the central object, whether standing or sitting, and let this figure, if standing, lean slightly over a pillar, ballustrade, &c., so as to assume also a curvilinear form, by which means almost the whole figure may be brought into focus.

In the next place, arrange the figures that are to occupy the right and left corners; cause them separately to advance or retire as circumstances may require, until each is sharply defined in this position. These three points will give an idea of the curve to be formed out of the rest of the figures, which have to be adjusted in focus in the same manner as the preceding objects. All this operation is mechanical, and conduces simply to reproduce nature as she really is, and not to make her worse and more distorted than she is. It requires great tact and patience. The moment the operator knows that nearly the whole of a portrait, and almost all the figures in a group, can be presented in photograph sharply and correctly defined, and thus free from distortion, his next aim, his next duty, will be to proceed a step further, and by an artistic posing of the individual parts, so as to represent a significant whole, elicit at the same time a correct reproduction and a beautiful composition. We shall recur to this second step hereafter; at present our design was to show how to avoid defects arising from the lens and from the use of the lens.

Landscape photography is subject to the same defects arising from both causes; but the mode of avoiding defects is somewhat different. Some people imagine that the photograph of a landscape must be a perfect reproduction of nature.

Let us examine this matter more closely, and see whether the lens is faithful in this respect. We are apt to compare a lens with the optical arrangement of the eye, and to conclude that what the eye can accomplish in sensation, so may the photograph exhibit in picture. This is a very erroneous conclusion; for there is no lens, and there never will be any optical combination that can represent upon a *surface* what the eye *feels* on the retina, or the *artist* can depict on canvas so as to simulate the sensation of the brain. For the retina, as we have previously elucidated, is a solid transparent substance in which there is depicted a miniature representation of every object seen in their relative proportions and distances, the *solid* picture being conjugate to the reality.

The lenticular part of the eye may not surpass in a great degree the proficiency in some lenses; as far as the lens, therefore, is concerned, we are justified in expecting the same sort and quality of result in either. But, is there a lens, was there every such a thing heard of, as a lens that could produce consentaneously an accurately sharp and undisturbed picture of near and distant objects on a flat surface? It is impossible to construct a combination that will perform this herculean task.

This being so, it is evident that only points lying in the same curve or concavity can be exhibited in sharp focus on a flat plane, and that all other points must be more or less *out of focus*. For instance, in the landscape before us, stand out prominently a herd of cattle, a pony, a pointer, and a quantity of poultry in the immediate foreground; behind hose, retiring into grim distance, are groves, villages, and mountains. Let us fix upon the spire of a village church some four miles off, and make that the principal object of our picture, and thus focus sharply upon this point. What is the consequence on the rest of the picture?

All the parts that are about equally distant from the lens as the spire of the church, forming thus a curve around the camera at a distance of four miles, will be in focus, sharp and undistorted; but the parts in the immediate proximity of the lens will be utterly out of focus, will be, therefore, disproportionately magnified and blurred in outline. If the pictures of the nearest objects were *merely magnified*, the defect would scarcely be perceived, because nature is so exhibited in the eye itself, with only this slight difference, that in the former case the magnitude does not vary inversely as the square of the difference, whilst in the latter it does; but the pictures of the near objects, by such a mode of focussing, are fuzzy in outline; and the photograph suffers besides for want of actinic influence on those parts.

If we were to focus upon some object, as our principal one, in the very foreground itself, then other very prominent parts in the distance, instead of being gradually smaller as they recede, will increase in magnitude, which is contrary to the conjugate effects of which the eye is cognizant.

This is the reason why the perspective of a photograph is in many instances a failure—the picture appears flat, unnatural, and distorted. The most charming landscapes in photograph sometimes fail totally to excite in us the sensation of their beauties—look at that magnificent ravine, miles in length, growing dimmer and darker, and terminated by a gossamer chain-bridge which is transcribed on the clouds—and now look at its photograph—is this a reproduction? Certainly it is, for there's the chain-bridge, there are pine groves, and here is the home of my fathers looking down upon the gulph beneath—but where is the gulph? where the charming perspective? How near the bridge looks! How flat and unlike is the picture to the reality! The parts are all here; but the impression on the senses made by the picture and the landscape are as different as night and day.

We have all, artist or no artist, recognized this defect in landscape photography, and been surprised at its removal in the stereograph.

Can a photograph be made or taken so as to represent nature or imitate the work of an artist?

This is coming to the point, and requires much caution, forethought, and especially vast experience, to be enabled to answer the question intelligibly and honestly. We will postpone the lesson to-day; for the temperature of the room is now 108°, altogether too high a temperature for deep thought and vital conclusions. The Lord grant that the *War* and the *Heat* may cease cosentaneously!

ON THE BEHAVIOUR OF CHLORIDE, BROMIDE, AND IODIDE OF SILVER IN THE LIGHT, AND ON THE THEORY OF PHOTOGRAPHY.

BY HERMANN VOGEL.*

The following statements constitute a summary of the results obtained by me:—

1. Light communicates to iodide, bromide, and chloride of silver the faculty of attracting and retaining nascent particles of silver.

2. Under otherwise similar circumstances, iodide of silver acquires this faculty in the highest degree, then follows bromide, and afterwards chloride of silver. Insolated iodide of silver acquires a blackish-grey colour in the developer, bromide a brownish grey, and chloride a pale brownish yellow.

* Continued from p. 427.

3. This action of light stands in no relation to its chemical action, for—

a. It shows itself at a maximum in that salt (Ag I) which undergoes no appreciable chemical change, and at a minimum in that (Ag Cl) which is most strongly chemically decomposed.

b. In the case of the chemically decomposable bromide of silver, the graphic action of light has already exceeded its maximum and become diminished before the chemical action is appreciable (by iodized starch paper).

Moreover, with chloride and bromide of silver the chemical colouration does not run parallel with the photographic, for the former continues increasing when the latter has long exceeded its maximum, and begun diminishing.

4. Clean paper, soaked in nitrate of silver and carefully washed, retains a trace of silver-salt, acquires a brownish colour in the light, and is then feebly sensitive photographically; that is to say, it is slightly coloured by the developer.

5. Nitrate of silver assists the photographic sensitivity of chloride, bromide, and iodide of silver. The relative photographic sensitiveness of the three salts, however, remains the same; that is to say, the iodide is the most sensitive, and the chloride the least so. (The photochemical sensitivity, that is, the faculty of becoming blackened in the sun's light, in contact with nitrate of silver, is greatest in the bromide.)

6. Moisture has no perceptible influence on the photographic sensitivity of the pure haloid salts of silver.

7. Acids diminish or destroy this sensitivity in iodide and bromide of silver, both during and after exposure to light: nitric acid is most energetic, and acetic acid weakest, in its action.

8. Iodide of potassium completely destroys the photographic sensitivity of iodide of silver, both during and after exposure.

9. Mixtures of bromide and iodide of silver are photographically more sensitive than pure iodide of silver;* that is to say, that under perfectly similar circumstances (equal exposure and similar mode of development) they become more intensely blackened in the developer than pure iodide of silver. Mixtures of chloride and iodide of silver behave in a similar manner. (Indeed, all silver salts which are chemically decomposable by light appear, when mixed with iodide of silver, to exalt its photographic sensitivity.)

10. The graphic action of light upon the haloid salts of silver increases rapidly up to a certain point, and then diminishes slowly (solarization).

11. This increase and diminution takes place simultaneously with iodide and bromide of silver; from this I conclude, that in both the maximum of photographic action occurs at the same time.

12. The time within which light exerts the maximum of its graphic action depends upon the intensity of the light. The more intense the light, the shorter the time.

I therefore regard it as highly probable that, for the attainment of the photographic maximum, a perfectly definite and always uniform product of intensity of light and time is necessary.

During the preparation of this memoir I met, in the *Photographische Archiv*, with a paper by Monckhoven on the "Theory of the Photographic Process," from which I see that he has occupied himself with the same subject as myself. It is with particular pleasure that I find, in the work of so noted an investigator in the field of photography, a confirmation of my results.

Monckhoven refutes Davanne's assertion that iodide of silver is decomposed by light into Ag and I (a notion which Davanne himself has lately given up), and maintains the opinion that iodide of silver, when exposed to the sun's light only undergoes a physical change, founding his views on the phenomena of solarization. (He has made no chemical investigations in connection with this.)

He likewise ascribes the production of pictures by means of chloride and bromide of silver, or of iodide of silver in contact with silver solution, solely to a physical action of light, but without mentioning the chemical changes which take place at the same time, and also states that each of these bodies possesses the property of solarization. Upon this point he has no more detailed statements.

I hope that, in my investigations described above, I have thrown light upon many points which Monckhoven has left untouched, although I feel that my attempts are still imperfect, and that the theme is still unexhausted. For the present, however, not to extend this memoir to a great length, I must break off, and leave the publication of my other researches for some future time.

* We are glad to find that in Dr. Vogel's experimental researches, this point, which we have steadily maintained against other authorities, as a fact in practice, is thus satisfactorily confirmed.—ED. PHOTO. NEWS.

PHOTOGRAPHING THE STARS.

WE extract, from a lengthy notice in the *Birmingham Mercury*, the following interesting remarks on some recent attempts to photograph night effects, by Mr. Breese, the prints from the negatives being transparencies for the stereoscope, after the manner for which Mr. Breese has already earned considerable reputation. After referring to the perfectness with which they bring the lake scenery into midland drawing-rooms, the notice proceeds:—

Their chief merit is that they do all this in the completest manner yet achieved, not only presenting to vision "the water and the dry land" in all their varied forms, and under all conditions, but, with the daring of science, stretching far out into space, and snatching thence the glittering orbs that light the night, and shed down through the ever-changing region of clouds a glory that paints the scenes of earth with that which Shakspeare has aptly figured as "liquid pearl."

Of these night scenes there are three—two interesting by reason of the magnificence of the scene they depict, and the marvellous faithfulness with which it is depicted, and one remarkable by reason of its novelty of subject, the novelty lying in the fact that it includes a representation of the first star that has ever been photographed. To Venus, as was fitting, belongs this honour, the moment chosen for limning her soft beauty being that of her last conjunction with the moon. The view is a grand one. Hill rises behind hill, far out into the blue distance, and over the topmost are seen the new moon and the one star visible standing out against the darkness of space, and seeming to throw a light over the silent barrenness of the scene below that clothes its sublimity with indescribable touches of the beautiful. The highest commendation that can be bestowed upon such a photograph is to say that it is true to nature, not only in form, but in effect; and in saying that, the fact is involved that all the depth, and grandeur, and beauty of night has been compressed into a few square inches of glass, which one may thrust into the stereoscope and gaze at until, forgetting his actual whereabouts and the time of day and night, he may imagine himself looking out from the summit of some mighty hill top upon the visible scene which nature herself in the first instance presented to the lens of Mr. Breese's camera.

As pictures, the two moonlight scenes, as distinguished from that in which we have the star in addition to the moon, are even more charming than the conjunction of Venus and the moon. One is "Grasmere by Moonlight;" the other is a scene that is familiar to us, and similar in character, but we forget its precise locality. In "Grasmere," the moon, half-veiled by a flaky cloud, shines down over a green hill, and glints along the surface ripples of the lake, flinging the shadows into deeper shade, and lighting up the open with a silver brilliancy. In the second view we have a clear, still night, with the moon at the full, and though one misses the picturesqueness of the clouds, there is a something in the vastness of the deep unbroken stretch of sky that atones for the want—the more so as the under view is equally fine with Grasmere.

Next to the moonlight scenes must be placed a couple of instantaneous photographs of the sea. In the one we get the rolling in of the tide, wave behind wave, with the foamy restlessness between, and the glassy back-flow down the sand; and in the other a magnificent breaker just bursting in upon the shore, and spreading out into a miniature sea of frosted silver, brilliant here and there with the sparkling of the sunlight. It is next to impossible, we believe, to catch the wave at the precise moment, when, rising to its full height, it curls over its dark, glassy forefront, and falls in such manner that you dimly see the substantial body of the wave behind and beneath the spreading spray. Mr. Breese,

however, has accomplished all but this. He has limned the wave just as the front spray has fallen over and concealed the hollow which seems still to lie hidden beneath it. Of the other specialities amongst these gems of the photographic art, the most noteworthy, perhaps, are "Sunlight after a Storm," and "Morning from Longhrigg, with Windermere in the distance." The still angry cloud masses, tipped with a first dawning of a sun-smile, in the former view, are marvellously beautiful; and looking far out into the distance where the full blaze of sunlight has already peered down behind the clouds and is lighting up the subsiding waves of a recently stormy sea with the first promise of returning fair weather, we seem to see the grim mass to the fore breaking sulkily up, and revealing the blue sky and the sunlight beyond. "Morning" presents to no less striking effect—the purple light peeping up behind the farthest hill, and being reflected in the broad waters of Windermere, while the hills, and valleys, and smaller lakes, further to the front, are still enshrouded in the cold grey morning twilight.

PHOTOGRAPHY AS A MORAL AGENT.

BY REV. H. J. MORTON, D.D.*

WE believe that photography is destined to become a moral agent of great power. The reason for this conviction is the fact that every invention by means of which human labour has been materially abridged, or intercourse facilitated, or information diffused, has eventually been followed by great and unanticipated influences on the moral as well as on the material interests of society. Photography does materially abridge human labour; it also facilitates the diffusion of information; therefore we see no reason why it should prove an exception to the general rule, and lie dormant and uninfluential amid the inventions which are moulding the world into new forms, and changing essentially the face of society.

The ability to produce instantaneously a perfect representation of any object, natural or artificial, no matter how complex in detail, to compress the labour of months into moments, to secure in seconds the results of weary seasons of toil; nay, to do what cannot otherwise be done by any possible amount of labour, in reproducing the minutest particulars with absolute certainty and infallible accuracy; this power, we think, cannot be exercised without vast ultimate issues to mankind. If it were otherwise, it would be an anomaly, and contradict all previous experiences.

When the first ingenious man contrived, by means of a little piece of tree-bark, to produce the embryo of a "printer's form," he had no idea of that "whereunto the thing would grow." But the invention reduced the toil of years to the labour of an hour. That little piece of carved wood, laid on the table of the monkish scribe in his cell, where he was painfully and patiently copying his manuscripts, virtually said to him and his fellow workmen, "Brothers Martin and Simon, you can lay aside your pens. Your occupation is ended, superseded, rendered useless. The knowledge which you are distilling, drop by drop, and distributing slowly, as a costly extract, for the use of a few learned men, will henceforth, by my agency, be poured out in copious streams, and flood the whole world. The poor man shall drink of it as of the water of life. It shall flow as a fair stream by every cottage door. The little child shall dip in it his tiny cup, and draw from it, and drink freely." And so it has happened.

Changing the figure, we would say, that little piece of carved wood has become a great ship, freighted with the world's literature, laws, and religion. It carried the Reformation in its hold, it carried all the arts and sciences as its cargo, and distributed them universally. Had it been wrecked, the world would have suffered a loss of freedom and civilization, disastrous beyond imagination. In vain had Paul planted, and Apollos watered. The isles had waited in vain for the fruits of knowledge.

Again, when the curious crowd gathered on the banks of the Hudson to watch the first turning of the wheels of the steamer which was to navigate the waters of that noble river, shouted as they saw the clumsy craft creep away from the wharf, they had little thought of the issues involved in the success of the experiment. "There she goes!" they said, as they saw the smoke of the steamer melting away, and mingling with the woods that crowned the heights of the distant Palisades; and they dispersed and departed to their homes or places of business, doubting whether the vessel would ever reach Albany; and when, on one bright morning, a dark spot was seen smoking and struggling down stream, the cry arose, "There she comes again!" it was simply the exclamation of ignorant surprise. The thing had been done, indeed, but what would come of it? Little of any moment, as they imagined. The old sloops would, indeed, be outsailed, unless favoured by a fair, fresh wind. Flour, bacon, butter, and up-country produce would reach the city more readily than before, but that was all! How different the actual results! The line which that poor puffing boat drew between New York and Albany, was in fact the first thread of a web, which, when mighty ocean steamers should become the swift shuttles, would be woven over the whole world, and cover all the earth with a garment of commerce and communicated knowledge.

The first railroad was a mere tramway for the transportation of freight over a few rods or perches. But it abridged labour, and facilitated intercourse; and now, having been perfected, it has bound the world with its iron bands, twitching continents together with sudden tension, annihilating space, increasing intercommunication, changing manners, and sowing villages and cities along its course; as though its rushing engines were living things, and the sparks sent out from their throbbing breasts seeds of life, which did not die as they fell upon the silent fields, but germinated there, filling all solitudes with the hum of human activity.

Finally, what a small matter the "cotton gin" seemed when it was first invented. A labour-saving machine indeed, but an apparatus for no grander purpose than rapidly and easily separating the seed from the staple! Yet that invention was destined to determine for generations the fate of millions of human beings! Had a prophet been present when that machine began to work, his eye would have seen it, as it separated the dark seed from the snowy film, dividing the black man from the white, and consigning the African to protracted servitude.

Now, with these and a thousand like unexpected moral issues, resulting from ingenious discoveries in science, who can doubt that photography has yet an important part to play in the moral history of the world? Its uses are daily and hourly multiplied. What was at first a mere curiosity, has come to be a convenience in almost every art, and a necessity in some scientific operations.

It is employed to detect and defeat crime, to distribute intelligence, to perfect knowledge. The astronomer finds it a helpmeet in his sublime studies, the anatomist an assistant in his minute investigations, the microscopist and natural historian a wonderful coadjutor in their varied fields of labour. It is an aid to the painter, the sculptor, the engraver, and the die-sinker. It helps the poor man to recall the features of his wife and children, and cheers his heart as he sits by the camp fire, or lies wounded on the battle-field. It awakens the sympathies of a whole people, by setting before them faithful pictures of what their brave defenders have become in distant prisons, and stirs up millions of hearts to resolve in the glorious revenge of rendering good for evil! It brings the world face to face with its great men, its orators, its poets, its statesmen, its heroes. It enables those confined in cities to travel over the world and to see all God's wondrous works, without quitting their firesides; and as it enlarges knowledge, its influence on men and manners must be important.

What it is yet destined to effect, when further improved and more widely applied, no one can foretell; but its powers are already proved to be vast and varied, and its influences promise to be proportionate.

* From the *Philadelphia Photographer*.

SUNDAY PHOTOGRAPHY.

We have received, from a correspondent at Exmouth, the following extract from a local paper, asking our opinion upon the subject, and also why, if such a law exist, it is only enforced in occasional instances. The question has three aspects, religious, legal, and social. On the first, we have simply to repeat the grandly tolerant words of the Apostle Paul, "Let every man be persuaded in his own mind." He who regards the Sabbath as a day of religious obligation errs, if he transact secular business; he who regards it as a "shadow of good things to come," belonging to a dispensation of forms and ordinances, is free from such obligation. As to the legal aspect, the law under which such prosecutions take place is an old and effete one, belonging to a dark and intolerant age, which no intelligent person would attempt to defend; but being still on the statute book, like many other foolish enactments, it permits the occasional acts of intolerance in which petty minds delight. In its social aspect, Sunday trading is a different question, and, except where it forms a necessary part of public convenience, we utterly condemn it. Sunday photography we regard as unnecessary and socially wrong and unjustifiable:—

Henry Symonds, a young man, was summoned at the instance of Sergeant Wellington, for that he did, on the 28th of August, at Broadhempston, exercise certain worldly labour, business, and work—in his ordinary calling of photographic artist, the said 28th of August, being Lord's day—by then and there taking the likeness of a person, the same not being a work of necessity or charity.

P. C. Holwill was called, and he stated that from information he received he visited the defendant's van at Broadhempston on the 28th of August, It was adjoining the Church House Inn. The defendant was in the van, and a young man named Palk was seated in the chair. The defendant said he had taken Palk's photograph. He had it in his hand. The defendant afterwards showed it to him (Holwill).

The defendant, in answer to a remark from the Bench, said he belonged to the Jewish persuasion. He kept the Saturday and worked on Sunday.

The Magistrates' Clerk observed that he did not know that would exempt the defendant.

The defendant replied that every photographic establishment in England was opened on a Sunday. He thought he could work on a Sunday instead of Saturday.

The Clerk informed the defendant that he was summoned under the 29th Char. II, cap. 7, section 1 (which was a very ancient Act), for the better observation and keeping holy of the Lord's Day.

The defendant said Sunday was not his Lord's Day.

The Clerk.—It is the law of England, and you are amenable to that law, if you do not keep the Sabbath.

Defendant.—The policeman only made the complaint because I would not take his likeness for a shilling, when he wanted me to.

The Chairman said the Bench were inclined to believe that the defendant was not fully aware of the law of the case, and he would be dismissed on paying the costs of the court. To say the least of it, it was a very indecent thing to be employed in that calling while people were going to church or chapel. He hoped this would prove a warning to the defendant for the future.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, September 14th, 1864.

M. Bertsch has produced a double automatic camera for instantaneous photographs. He describes it as follows.

My new automatic camera is based on the same principles as the previous one. It is focussed for all distances beyond the foreground of the picture to the horizon, so as to give aplanatic pictures 2½ inches square, which can be enlarged by my megascope without showing any distortion. It is nevertheless different inasmuch as the optical portion is formed of combined lenses so as to permit of taking instantaneous pictures with wet collodion. Like the previous one, it is contained in a box serving as a laboratory so that the operator can work in the open air. To satisfy the twofold problem of sharpness and rapidity, I have sought for a combination that would permit me to receive, and make to concur in the formation of the image, all the rays that fall upon the anterior glass, even under an angle of 30 degrees.

I have calculated the focal distances, and that which separates the lenses so that there may be no eclipse, and so that the sensitized plate may receive the same quantity of light at the edges as at the centre, in order to avoid the phenomenon known as centralization.

The stop which I have applied, although simpler than any other, seems to me to be also more convenient, because there is nothing to disturb its function, and as the hand suffices to accelerate or check its action according to the quality of the light, and also according to the rate at which the objects to be photographed are moving. As this camera does not require focussing, the ground glass would be useless, and is replaced by a level, by means of which the position of objects on the sensitized plate is determined at a glance. The pictures it gives instantaneously cannot be enlarged more than sixteen times without prejudice to their sharpness.

I have also placed in the cap serving as a stop, a diaphragm of small diameter by which we can obtain the maximum of sharpness whenever the objects move sufficiently slow to admit of a pose of one or two seconds. In this case the proofs may be enlarged to the dimensions of one or two sheets of paper.

If the stereoscopic proofs upon glass now exhibited have not a very picturesque character, they have at least the merit of showing the problem I wished to solve; there are the birds and other animals of the *Jardin des Plantes* taken in their cages, and, so far, at liberty in their movements. These proofs were taken on a bright day under a blue sky, always, as is well known, unfavourable to experiments of this kind, and none of the processes recently described as the most rapid have been employed. The collodion was neutral; the silver bath contained, as I stated a dozen years ago, a very small proportion of nitrite of silver. The developer was pyrogallic and acetic acids, and no particular intensifying was employed.

It would appear that photographic exhibitions have not been particularly popular this season. That of London has been, it is admitted, a pecuniary failure, while that of Paris has been only partially successful. This cannot be attributed to a decline of public interest in photography, which has certainly never been in a more flourishing state than at present. The failure of the London exhibition was due, not, I think, as the correspondent of *Le Moniteur de la Photographie* suggests, to four other pictorial exhibitions being open in the vicinity at the same time, but rather to the Draconian conditions imposed on exhibitors, which led the public to think that the exhibition was scarcely worth the trouble of a visit. The comparative failure of the Paris exhibition is not so easily accounted for, for it was rich in proofs of every kind, and was a full and complete exponent of the recent progress and present state of the art. May we suppose that these exhibitions occur too frequently, and that in the eyes of a miscellaneous public, they begin to assume a monotonous aspect? As works of art, photographs are, from the absence of colour, severe in character, consequently their pictorial merits are invisible to the common herd of sight-seers, and connoisseurs are not sufficient in number to constitute a paying public for exhibitions. But exhibitions are essentially necessary to sustain the photographic art, and means should be devised, before it be too late, to render them popular: to this end a wide latitude must be given to exhibitors, and one feature of attraction which has been suggested by a contemporary, may perhaps be found in the introduction of apparatus, chemicals, and the practical operations of photography, performed at stated intervals each day: photographic demonstrations, in fact.

The numbers in the catalogue of the London Exhibition were 270 while those of the Paris Exhibition amounted to 1195. The latter not only exceeded the former in number, but also in variety. Still, to render it justice, the London

Exhibition was more varied than usual, and presented choice illustrations of the applications of photography. An exhibition that included specimens by Mr. Toovey of Brussels, of Mr. Bingham, of Paris, by Mr. Osborne of Australia, by Colonel Henry James and Mr. Swan, could not be deficient in interest, which was strengthened by the portraits from Williams, Robinson, M. Claudet, and M. Joubert, Messrs. Hennah, Kent, Ross, and Thompson.

The chief characteristic of the French Exhibition was variety, specimens of all, or nearly all, the various applications of the photographic art were to be seen. Most prominent among these were the productions of the candidates of the Duc de Luynes' prize; the number was very considerable, but the photographic engraving of M. Nègre, and the photolithographs of M. Poitevin appeared to command the most admiration; while the productions in carbon printing by Messrs. Poitevin, Swan and Pouncy, had also a very large accession of admirers: the splendid vitrified photographic enamels produced on porcelain with the salts of iridium by MM. Lafon de Camarsac and Poitevin appear to have solved the question of permanent photography, and excited great interest. Enlarged photographs were magnificently represented, and it must have been somewhat embarrassing to the jury to award the portion of merit to productions obtained with the recently invented apparatus, of MM. Bertsch, Liebert and Monckhoven.

Another, and, perhaps, the most interesting among the applications of photography, occupied a deservedly prominent place in the Paris Exhibition—this was photosculpture; the numerous and remarkable specimens that met our eyes, —statuettes, busts, and medallions, of all sizes, proved that this branch of our art has become decidedly practical.

Other applications that remain to be mentioned, are the mieroscopie ornaments of M. Dagron, the panoramas of mountains of M. Civiale, the reproductions of pictures by MM. Bingham and Fierlants; the photographie *vitraux* of M. Samson, &c.

The general impression left by an examination of proofs obtained by ordinary processes is good, indicating progress. In portraiture, the *pose* was more carefully studied, more artistic, than ever: in landscape there was greater softness and delicacy of detail; those by M. Rousset were particularly good.

The photographie speciality of the London Exhibition appeared to be the compositions, in which Mr. Robinson has produced such beautiful results. This time he had a powerful competitor in Lady Hawarden, whose picture, which obtained a prize, was doubtless the most perfect thing of the kind yet seen.

As the success of Photographic Exhibitions must necessarily depend upon popular support, on the admiring and sight seeing thousands, rather than upon the critical or scientific units, it is to be hoped that the lesson of the present year may not be thrown away by our Photographic Societies. However desirable it may be to keep the art within its legitimate sphere, it will be folly to run counter to popular taste upon which depends popular support.

M. Mathey suggests a method of obtaining flattering likeness in portraits, and considering how difficult it is to please the fair sex in this matter, his suggestion assumes a high degree of importance. The plan is to have a lace curtain stretched on a wooden frame, placed between the camera and the sitter: the farther the curtain is from the model, and, consequently, the nearer it is to the lens, the softer the features appear; the threads of the lace give the *grain* of a chalk drawing or engraving, and the defects of the model are modified and softened down.

M. Mathey has also a method of illuminating the backgrounds to his portraits, so as to dispense with the employment of the stained glasses for vignetting in printing. To this end he cuts a hole in the canvas background 20 to 30 inches in diameter. Outside the room he arranges a mirror, or an universal hinge, which reflects the sun's rays on a transparent background placed at a suitable distance behind the hole. The light from the mirror, passing through a round aperture, forms a circular halo upon the transparent background, upon which the head of the model is suitably adjusted. Under these circumstances the head appears dark upon a light background. The effect may easily be reversed.

PHOTOGRAPHY ON WHEELS.

Sir,—I beg leave to say two or three more words in reply to "Somerset," and then I think the question of *one* or *two* wheels may probably be dismissed.

If I had not had my *two* wheels in use for five years, I might have been terrified by the prospect of disasters drawn in so lively a manner by your correspondent: all I can say is, that I have got on exceedingly well. The fact is, that no two photographers work exactly in the same way, and what suits one may be found very inconvenient by another. This discussion may be of use chiefly in suggesting a more perfect way than either to some third person. Meanwhile let me say briefly:—

1. There are many paths (and those very frequented ones), where even the *one* wheel could not be used; *e.g.*, in various parts of the English coast, in Switzerland, and even in Dovedale. Here it will be found of great importance to have three or four portable packages instead of one large box.

2. On the *two* wheels you can put any kind of apparatus you please; but those who use only *one* are debarred from the use of tents of all kinds, and must use a developing box, an arrangement which I do not think is in favour with the majority.

3. I do not carry my camera; the wheels do that, whether in the store box or out of it. Neither must I unload when I want to rest. The principal weight being *low* between the wheels, it can rest on either end; and for the same reason it is not so liable to upset as "Somerset" appears to think. The lens, if of any size and value, is best carried in a sling case, whether you have one wheel or two.—I remain, sir, your obedient servant, A London Amateur.

September 7, 1864.

MR. SWAN'S PATENT.

Sir,—In your last issue you say that Mr. Swan's "first claim is for the invention of tissues, which shall render the process of printing from the back, and developing from the front, simple and easy." If this be his principal claim to the new process of carbon printing, it is practically the same as detailed in my letter in the News of September 4th, 1863. Therefore those who carefully read your publication, should not require to refer to its past volumes to find out the originality of a process which was never practically applied until I distributed specimens executed as stated above.

Having been a contributor of articles on photography to the scientific publications, long previous to the existence of any journal being wholly devoted to its interests, I had expected, that if I had in any way assisted to promote the practical application of a carbon process, it would have been mentioned by you in the article as above alluded to. However, I have reason to believe in the possibility of making individuals inventors of processes to which they have no claim. I was of opinion that a patent was an exclusive privilege given to an inventor, and that others wishing to practise or use the invention, either for amusement or profit, required the patentee's consent in writing, first had and obtained. Mr. Swan proposes to allow amateurs and professional photographers to use his patented invention, only retaining to himself the manufacture of the tissue. However, I beg to inform him, that the courts of law require all patentees to protect their rights to their property in their patented invention the same as if it were landed or chattel property, and if they do not do so, but allow their privileges to become a common property, the law assumes that they have abandoned their claims to their previously acquired privileges.—Respectfully yours, Francis S. Beatty.

29, *Chapel Street, Dublin, September* 13*th*, 1864.

[The fact that Mr. Swan has invented a specific tissue, for a specific purpose, and to be used in a specific manner, is in no wise invalidated because Mr. Beatty invented another form of tissue for another purpose. We are aware of Mr. Beatty's long connection with photography, and of his labours in connection with permanent printing, which we have pleasure at all times in recognizing. As regards photographic patents, we never counsel them; but justice demands that we should vindicate the right of any discoverer to protect his discovery in his own way. It is somewhat singular that Mr. Beatty, amongst other enclosures, forwards us a picture, with apparently the same treatment as that employed in producing Mr. Squire's and Mr. Tunny's enamel surface.—Ed.]

POLISHING MATERIALS.

Sir,—As constant readers, who have more than once profited by your excellent periodical, we venture to forward to you the following, as likely to be useful to photographers. Some years ago we employed, with capital results as a polishing material for glass plates, a substance known as *tripoli*, imported, we believe, from the island of Corfu. It was an exceedingly fine powder, and gave better results than any other substance we are acquainted with, and with very slight labour. Our stock of this substance being nearly exhausted, we applied for more, and were informed that none was to be had; the parties who originally sold it stating that it had been found too expensive, and that "crocus" was generally preferred. Now, it is well known that *crocus* imparts to glass a red tinge, which it is impossible to get rid of. At last a dealer in photographic chemicals sold us a sample of what he stated to be "*fine tripoli*," but which did not possess the same polishing qualities as our old lot, of which we had a little left, that enabled us to compare it. As this "*fine tripoli*" was somewhat expensive, and did not appear to be a genuine article, we decided to put both samples into the hands of some eminent scientific chemist, and to get his opinion upon them. We therefore decided upon forwarding the samples to Dr. Phipson, and to-day we have before us his report and analyses of both samples. It will be easily seen that the substance sold to us the other day as "fine tripoli," at the enormous price of 8s. per lb., is not *tripoli* at all, but a kind of impure chalk. Here are Dr. Phipson's analyses:—

	No. 1. Genuine tripoli.	No. 2. Substance sold as such.
Silica	82·5	0·0
Water	8·4	5·0
Oxide of iron and alumina	4·5	5·6
Sand	3·6	1·0
Carbonate of lime (chalk)	0·8	88·4
	99·8	100·0

We think it advisable to make known these simple facts, for it is rather too good a joke, so near as we are to Dover Cliffs, to have chalk sold to us at 8s. per lb.

Dr. Phipson informs us that genuine tripoli is an excellent polishing material, being chiefly formed of the fossil remains of animalculæ, is easily distinguished under a good microscope from any other substance that may resemble it in appearance.—We are, sir, your obedient servants,

W. and J. Morris.

West Ham, E., September 12th, 1864.

Photographic Notes and Queries.

Preliminary Coating of Gelatine.

Sir,—I beg to offer my best thanks to Major Russell for his reply to my note addressed to you, and at the same time to assure him that the plates could not possibly be greasy, every precaution having been taken to guard against it. As he speaks strongly against wash leather, on the first appearance of an apparently greasy plate I discarded it altogether, and used a *clean* linen cloth, and also silk, but all to no purpose. I have not only used the material sold as "diamond polish," but old collodion, alcohol and tripoli, and a mixture of both, as Major Russell recommends. The gelatine I have used is Nelson's, the strength varying from 2 to 5 grs., with and without alcohol and bromide of cadmium, used hot or cold, the result is the same. The fluid flows nicely over the plate, but as soon as the excess has drained off into the measure, that remaining on the plate begins to come away from the edges, and gradually all over the plate, until it collects in small globules, or runs off in streams.

I have ordered a fresh sample of gelatine, which I will try together with the cleaning fluid given by Major Russell; I will let you know with what results.—Yours faithfully, A. A.

Talk in the Studio.

The British Association for the Advancement of Science.—The thirty-fourth meeting of the association commences its proceedings this week, at Bath, under the presidency of Sir C. Lyell, M.A., F.R.S., &c. We shall publish in our next such of the proceedings as will interest our readers.

Panoramic Photographs.—We have recently had an opportunity of inspecting an admirable series of photographs produced by Mr. J. R. Johnson's panoramic camera. The pictures are of two sizes, 7 inches by 3½, and 12 inches by 6, including on a flat plate considerably over 100°. Many of them consist of landscapes, with admirably disposed groups of figures, natural skies with fine clouds, &c., and are very beautiful in effect. Mr. Johnson has, whilst retaining the principle described in his specification, published in our pages some time ago, materially improved many of the mechanical details, and now secures perfect definition and complete continuity of the picture, no trace whatever being present of the respective movements of the plate and lens necessary to produce the result.

Test Card of Actinic Colours.—We have received from Mr. Leon Daft a little invention for the convenience of portraitists. It consists of a card with eight strips of coloured paper mounted thereon. The tints are various, blues, yellows, reds, lavenders, &c. Opposite to each strip is printed a series of tints in monochrome illustrating the depth of tint which the colour opposite to it would yield in photography. This shown to or distributed amongst sitters will serve as a guide in dressing, and save the photographer much trouble in having to photograph incongruous colours combined in one costume, and prevent disappointment to sitters when they see what they believe to be dark dress come out light, and *vice versâ*. On the opposite side of the card are a few suggestive instructions on the subject. We commend the card to portraitists, professional and amateur. Mr. Jabez Hughes, Oxford Street, is agent for the card.

Modified Carbon Process.—Mr. Tunny, of Edinburgh, in a recent communication to *Le Moniteur de la Photographie*, describes a modification of Fargier's carbon process, which gives results of which the editor, M. Lacan, speaks in the highest possible terms. The mode of proceeding is as follows:—After obtaining the proof upon glass in the manner followed by Poitevin and Fargier, he moistens a piece of albumenized paper cut a little less every way than the plate, and attaches it to the film. The albumen is then coagulated with alcohol, and after detaching the whole from the glass—which is facilitated by the plate having been coated with ox gall before the gelatine is applied—the picture is developed with hot water.

Grotesque Photography.—*Humphrey's Journal* says:—"At the door of Mr. Holmes, photographer, Broadway, a very interesting portrait of Father Abraham is exhibited. This portrait consists of a striking outline of the President, studded all along with minute portraits in juxtaposition. All the distinguished characters in America, such as generals, politicians, divines, poets, ladies of the buskin and of charity; these beheld at a distance confers on the President's physiognomy the appearance of the ravages of small pox. Jefferson Davis has his position in the president's eye; General McClellan's on his nose; near his ear are seen his ministers. Barnum occupies a commanding position, his forehead; while Messrs. Bennett and Beecher are his aids on either side. Miss Cushman sits upon his lips, and a little negro on his breast, and Fremont on his heart. Amongst the numerous smiling damsels that adorn this

photographic gem may be distinguished Belle Boyd and Mlle. Vistoalc. The likenesses are all striking, and the composition, as a whole, is a felicitous performance.

ACTION OF LIGHT ON PLANTS.—M. Boussingault has recently laid the result of a highly interesting series of experiments on vegetation before the Academy of Sciences. The most important fact is, that while plants, when exposed to light, fix carbon, hydrogen, and oxygen, when placed in darkness they eliminate these elements.

CARD PORTRAITS.—The *Reader*, speaking of card pictures, says:—"These photographic likenesses bring out all that is most vulgar and pretentious in our age—officers and civilians attitudinizing in their respective uniforms, and, worse still, clergymen, with the Bible in their hands, in their preaching attitudes (fancy St. Paul posing himself for a photograph in the attitude in which he addressed the Athenians)—ladies in moire antique and babies in long clothes—all bidding for public notice. There may be, and we believe there is, an amiable motive at the bottom of it all; but surely the great majority of these good people might forbid the public exhibition of their beauty or ugliness, especially when there is no human thought or faculty present in the production of their portraits, the presence of which alone justifies the portrait-painter in the exhibition of his work, and redeems it from impertinence. The exhibition of their photographic likenesses in every shop-window is perhaps one of the penalties imposed upon public characters; but ordinary individuals are not called upon to exhibit their portraits in a photographic exhibition, unless there is really some remarkable improvement in the process by which they are gibbeted for public display.

CATALYSIS.—When some managing mamma had succeeded in making a match between one of her daughters and some eligible young man, it is frequently the case that the young people are entirely unconscious of the external influence that has brought about their union. In the world of inanimate matter there are substances which possess a power closely analogous to that of the "match-maker"—a power not less subtle, not less mysterious, and more uniformly efficient, than hers. Cold oxygen gas and carbonic oxide may lie in contact for years without combining together, but if a piece of clean platinum is placed in the mixture, the two gases immediately manifest an affection for each other, and enter into combination. The platinum itself undergoes no change, but induces the union of the other two substances by its simple presence. This is catalysis. If starch is mixed with saliva and kept for a few minutes at a temperature of 100°, it is converted into sugar by a catalytic action of the saliva. It is stated by Dalton, and other eminent physiologists, that nearly all of the chemical changes which occur in the animal economy are due to this mysterious property.

TO VARNISH ARTICLES OF IRON AND STEEL.—Dissolve ten parts of clear grains of mastic, five parts of camphor, fifteen parts of sandarach, and five of elemi, in a sufficient quantity of alcohol, and apply this varnish without heat. The articles will not only be preserved from rust, but the varnish will retain its transparency, and the metallic brilliancy of the articles will not be obscured.

PRESERVATION OF CHLOROFORM.—It requires but a short time for chloroform which is exposed to the sun's rays to undergo decomposition, hydrochloric acid being developed, and a strong odour of chlorine being present. This is prevented if the chloroform is kept in the dark; and when it has undergone decomposition by exposure, M. Boettger finds that it may be easily purified by shaking it up with a few fragments of caustic soda. As long, indeed, as it is in contact with the caustic soda it may be preserved for an indefinite period in diffused light. These facts should be borne in mind by those who use amber or benzoin varnish of which the solvent is chloroform.

To Correspondents.

DERFLA.—In using chloride of sodium to decolourise the sensitizing bath, the strength of the chloride solution is not important. A ten-grain solution, added a few drops at a time, until a precipitate is formed, which carries down the colouring matter, will answer the purpose. 2. Intensifying with bichloride of mercury and iodide of potassium may be conducted altogether in daylight. 3. We have repeatedly given formulæ for the use of nitrate of soda with silver bath; try 60 grains of nitrate of soda and 35 grains of nitrate of silver, and fill up from time to time with a 50 or 60 grain solution of silver only. 4. A zinc trough, unless it be well painted or varnished inside, is not suitable for the hyposulphite of soda. 5. Float the paper about 3 minutes. 6. A wooden trough well varnished inside, may be used for washing prints. 7. We believe the silk you enclose will answer the purpose; especially if you use two thicknesses. 8. As a rule, a creamy film depends upon the character of the collodion. Sometimes it happens that a sample good in all other respects, gives a thin opalescent film, owing to the solvent being anhydrous, the film does not then readily permit the permeation of aqueous solvents. In such case the addition of a drop or two of distilled water to each ounce of collodion, will remove the defect. The print you mention is doubtless copyright.

A YOUNG HAND.—The photographic caricatures to which you refer, with small bodies and colossal heads are produced in this way:—A large photographic head of the person is first taken, and cut carefully out from the rest of the body. Then a small print is taken and cut out, carefully removing the head; the two are then mounted on another piece of paper, so as to join. The whole is then carefully touched with a pencil and suitable pigment, so as to prevent any appearance of a crude junction, and another reduced negative is then taken from this to print from. The result may be attained by other means, but this is the most simple. 2. The double sulphate of iron and ammonia may be procured of most dealers. To make it, you must add ordinary sulphate of iron and sulphate of ammonia together in their atomic proportions; take 139 parts of sulphate of iron, and 66 parts of sulphate of ammonia; make a hot strong solution of each, mix the two and then evaporate and crystallize. When a formula gives 25 grains of the sulphate of iron and ammonia, it means that amount of the double salt.

NELSON K. CHERAILL.—There are wood engravers who advertise that they photograph direct on the wood, and engrave the photograph so produced. Mr. Bolton, of Danes Inn, has done some good work of that kind, but we have no knowledge of his charges.

S. F. TUNSTALL.—The design of your glass room will do; but it would be improved by leaving the top light at a greater angle, we have not time, we regret, to write private letters on such subjects.

A SUBSCRIBER.—We see no reason why the chloride of silver should not be precipitated in a cask which has been coated with pitch inside as well as in any other vessel. Are you sure that it is not precipitated? Have you drawn off the water to examine, or are you deceived by the appearance of the water in the large dark vessel? The gold you have precipitated will subside in time, or you may filter the solution, and save the filtrate.

E. W. P.—You will find the information you require on p. 53, of our 5th volume.

U. Y.—We only know of one patented method of photography on the wood block for engraving. The specification is published at p. 170 Vol. III., PHOTOGRAPHIC NEWS. Most of the methods employed are secret methods. You will find a method described, which is the best we believe yet discovered at p. 193, of our first volume.

W. A. R.—We fear that we cannot suggest any plan of getting more light into your room, or on to the sitter, without more glass. Your top light wants to be a little in front of your sitter.

ONE WHO STUDIES THE NEWS.—Your reproductions are very good indeed, and very interesting. We are obliged by your offer of the loan of the little work in question. There is no specific work on the carbon process yet published.

WM. S. PARAY.—We are obliged by your suggestion; but we fear that the introduction of miscellaneous reading into our pages would fill the space properly belonging to the subjects, to give publicity to which our journal exists. We render the contents as varied as the speciality of its purpose will permit, so as to give something for every class of mind amongst photographers. We will think of the matter, however, and give it our best attention.

J. J. F.—In the wet process a collodion with a bromide only is slower than one with iodide only, but a bromo-iodized collodion is quicker than either, as well as cleaner, softer, and better in many respects.

F. T.—A print from the same negative, with a paper excited on a weak nitrate bath and printed in the sun, will probably be much softer and more pleasing. Try a Saxe paper.

G. A. HAMMOND, Kingsclear.—Subscription, since the receipt of the 10s., paid to No. 307.

CAMERA.—A single lens of 6 inches focus, will not cover a 5 by 4 plate well, no matter by what name it may be called. By using a small stop, and cutting the print to such a shape as suits the definition, passable prints, 5 by 4, may be obtained, but covering properly is another question.

A. GRANT, JACKSON BROTHERS, J. C. TWYMAN, T. PRYCE, J. M. BURGESS, and some others, received with thanks, and shall have attention in our next.

Several correspondents in our next.

Photographs Registered during the Past Week.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne.
- Two Photographs of Robert Chambers.
- One Photograph of Sir Walter James, Bart.
- Photographic Group of Duchess of Northumberland, C. Palmer, Esq., Rev. W. F. Wheeler and Co.

MR. JAMES ARMSTRONG, Mechanic's Hall, Carlisle,
- Photograph—Local Caricature.

MR. W. RUNICLES, 7, High Street, Eton, Windsor,
- Two Photographs of the Friends' Meeting House and Tombs, at Jordans, Berks.

MESSRS. HELSBY AND CO., 34, Church Street, Liverpool,
- Two Photographs of Miss Blanch Wilton.
- Two Photographs of Miss Marie Wiltou, Strand Company.
- One Photograph of Miss Nellie Nesbitt, as Lady Clare, in "Robin Hood."
- Oue Photograph of Miss Hubbart.
- One Photograph of Mr. Charles Fenton, of the Strand Company.
- One Photograph of Mr. George Honey.

MR. THOMAS ANNAN, 202, Hope Street, Glasgow.
- Two Photographs of Dr. Livingstone.

MR. THOMAS WORDEN, 41, Grainger Street, Newcastle,
- Photographic Group of the "United Eleven of all England" (Cricketers).
- Photographic Group of the "Twenty-two Northumberland Club," (Cricketers).

MESSRS. HOLDERNESS AND HIGGINSON, 36, Charlotte Street, Preston.
- Three Photographs of Rev. Dr. Goss.

THE PHOTOGRAPHIC NEWS.

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THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The holiday of the *savans* is over. The thirty-fourth annual meeting of the British Association, held at Bath, under the presidency of Sir Charles Lyell, which began on Wednesday the 14th instant, was concluded on Wednesday last, having been in all respects a satisfactory and successful gathering. The papers principally relating to photography will be found printed in abstract or at length in our present and next number; but we may here glance at a few of the general features which may be interesting to our readers.

The able opening address of the President, which, unlike such speeches usually, was less a review of general scientific progress than a contribution to that special branch of science with which Sir Charles Lyell's name is associated, contained one announcement, which, whilst of great interest to every one who heard it, may have a special importance to photographers; we refer to his intimation of the recent discovery of a very extensive source of the hitherto rare metal *lithium*, in a hot spring, lately found at Redruth, in Cornwall. This spring contains a very large quantity of solid matter, the proportion being four times as great as that of the Bath waters, and not less than the twenty-sixth part of this solid matter consists of the metal lithium. We subjoin a brief extract from the address, giving some details:—

It seems that in the year 1839, a level was driven from an old shaft, so as to intersect a rich copper-mine at the depth of 1,350 feet from the surface. This lode or metalliferous fissure occurred in what were formerly called the United Mines, and which have since been named the Clifford Amalgamated Mines. Through the contents of the lode, a powerful spring of hot water was observed to rise, which has continued to flow with undiminished strength ever since. At my request, Mr. Horton Davey, of Redruth, had the kindness to send up to London many gallons of this water, which have been analysed by Professor William Allen Miller, F.R.S., who finds that the quantity of solid matter is so great, as to exceed by more than four times the proportion of that yielded by the Bath waters. Its composition is also in many respects very different; for it contains but very little sulphate of lime, and is almost free from the salts of magnesium. It is rich in the chlorides of calcium and sodium, and it contains one of the new metals cæsium, never before detected in any mineral spring in England; but its peculiar characteristic is the extraordinary abundance of lithium, of which a mere trace had been found by Professor Roscoe in the Bath waters; whereas in this Cornish hot spring, this metal constitutes no less than a 26th part of the whole of the solid contents, which, as before stated, are so voluminous. When Professor Miller exposed some of these contents to the test of spectrum analysis, he gave an opportunity of seeing the beautiful bright crimson line, which the lithium produces in the spectrum. Lithium was first made known in 1817 by Arfvedsen, who extracted it from petalite, and it was believed to be extremely rare, until Bunsen and Kirchhoff, in 1860, by means of spectrum analysis, showed that it was a most widely diffused substance, existing in minute quantities in almost all mineral waters, and in the sea, as well as in milk, human blood, and the ashes of some plants. It has already been used in medicine, and we may therefore hope that, now that it is obtainable in large quantities, and at a much cheaper rate than before the Wheal Clifford hot spring was analysed, it may become of high value. According to a rough estimate which has been sent to me by Mr. Davey, the Wheal Clifford spring yields no less than 250 gallons per minute, which is almost equal to the discharge of the King's Bath, or chief spring of this city.

It may be remembered by our readers, that some able photographers who have experimented with the iodide and bromide of lithium, believe it to possess photographic qualities of the highest importance. Colonel Stuart Wortley gives to these salts an especial preference for instantaneous photography, on the ground that the collodion prepared with them is at once more sensitive and more stable than any other. Hitherto the very high price of lithium and of its salts, has prevented their extensive use in photography; the first example we used of iodide of lithium, some three or four years ago, cost a guinea an ounce. It is somewhat cheaper now, we believe, but the discovery of such an abundant source will doubtless effect a considerable further reduction, and whatever real advantage may be found in its use, will be placed readily within the reach of photographers.

One of the most interesting photographic features of the meeting was Professor Roscoe's eloquent lecture on the chemical action of light, as especially illustrated by what he termed, "that most beautiful of modern arts—photography." The lecture was an admirable and well-digested statement of the known facts in connection with the chemistry of light; and the illustrations, especially those of a photographic character, conducted by Mr. Brothers, with the aid of the magnesium light, were much to the purpose, well managed, and delighted the audience immensely. We were especially pleased, also, with the modesty with which Professor Roscoe put forth any theoretical views on a subject on which he frankly stated we knew but very little. Far as the art had progressed, he said, we could give little or no scientific explanation of the mode of action of the various re-agents used in photography. We commend this modest reticence to the attention of some of those who dogmatize on the scientific aspects of photography without possessing a tithe of the lecturer's real knowledge.

Professor Roscoe's papers, in the chemical section, were also full of interest, both that on a "Photometer for Meteorological Observation," and that on "Quantitative Photography," being based primarily upon the system of actinometry, devised by Professors Roscoe and Bunsen. This method depends on the degree of colouration produced by light upon a piece of sensitive paper, to be compared with a carefully graduated test piece of paper. Professor Roscoe states that after very many careful experiments, they find that they can, in the first place, prepare paper of uniform sensitiveness, and that they find that intensity of light and length of exposure bear a definite relation, and are convertible; thus, that an intensity of light equal to 50, with

an exposure of 1, gives the same amount of colouration to a piece of sensitive paper as an intensity of 1 and an exposure of 50. This presents two points, which would appear to be contrary to the general experience of photographers. They have not believed that, hitherto, it was possible to prepare paper of uniform sensitiveness, the organic matter used in the sizing of the paper being an uncertain and inconstant quantity not under their control; and they have believed that a deeper colouration was produced by a low intensity and a long exposure, than by a high intensity and a short exposure; and that, simply because with the high intensity a slightly darkened surface was at once formed, which really acted as a protective to the chloride of silver underneath, preventing its rapid colouration.

In a conversation we had with Professor Roscoe, we pointed out these discrepancies between the experience of photographers generally and the conclusions which were at the foundation of his present experiments. The explanation he gave meets the case to a large extent, if not entirely; and, in any case, he assured us, that the results had been verified with the utmost care. The depth to which the sensitive paper is coloured in the experiments in question is never great, never proceeding beyond a light brown. When the colouration proceeds beyond that, it ceases to be useful from the difficulty of comparing degrees of depth in dark tints. It is, then, to light tints alone that the experiments refer; Professor Roscoe remarking, that where the printing was carried to a depth necessary for photographic pictures, both the quality of the paper and the quality of the light would probably materially affect the character and depth of the colouration.

In his contributions to a system of quantitative photography, the facts are of very deep interest to photographers, some of them being a little at variance with the recently published conclusions of Dr. Vogel. As the experiments are not yet fully concluded, we shall not enter further into the subject than to point out the fact upon which the Professor has satisfied himself, that the strength of the nitrate of silver bath exerts little or no influence upon the sensitiveness of the paper, but that it is materially affected by the strength of the salting solution. As soon as the experiments are completed, Professor Roscoe has promised to favour us with a report and tabulated results, to lay before our readers.

In the discussion which arose upon these papers, Dr. Daubeny called in question Professor Roscoe's statement, that in the nutrition of plants carbonic acid was decomposed by the chemical rays, and referred to Professor Draper's experiments, in which he showed the decomposition was due to the luminous rays. On this subject Professor Williamson pointed out the danger of being misled by the loose use of terms. Wherever such action was produced by light, the ray so producing it had chemical action, whether it belonged to the luminous rays or those of higher refrangibility. It was important to bear in mind that all the rays possessed more or less of chemical action on different bodies, and in the measurement, the substance upon which they acted was as important an element as the colour of the ray producing that action.

M. Claudet's very beautiful examples of photo-sculpture excited considerable interest, and afforded in one instance an admirable opportunity of judging of the fidelity of likeness which was secured. An admirable portrait of bust of Sir Charles Lyell, the President, in plaster and in bronze, was exhibited. The photographs for this, as M. Claudet informed the audience in his paper, had only been taken three or four weeks previously. They had been placed in the hands of the photo-sculptor, who produced the bust in question, without ever having seen Sir Charles at all. As the bust was perfect as a likeness, as well as admirable as a work of art, testimony more satisfactory to the value of the process need not be desired.

Some very fine and very large photographs of the moon were exhibited by Mr. Brothers, of Manchester. These were the most perfect and brilliant enlargements of the kind we have seen. They were obtained from Mr. Delarue's negatives, by Mr. Brothers, an enlarged transparency being obtained first, and from that an enlarged negative, the amount of amplification being above forty diameters.

An interesting application of microscopic photography, by Mr. H. C. Sorby excited considerable interest. Various kinds of iron and steel are first dissected by means of acids, so as to show their structure. Of these microscopic enlargements by means of photography are obtained, which furnish a most valuable mode of examining the exact structural character of each specimen of the metal. At the microscopic soirée, which we were not able to attend, we understand Mr. Highley exhibited some very fine examples of microscopic photography as transparencies for the magic lantern, which excited attention. Mr. F. Breton, of Portsmouth, has recently favoured us with some of the most perfect examples of microscopic photography on paper which we have seen, and these were intended for exhibition at the same time.

The British Pharmaceutical Conference sat in Bath during the week. We shall probably give some extracts from their proceedings, so far as they were interesting to photographers, in our next.

The next meeting of the British Association will be at Birmingham, under the presidency of Professor Phillips.

FILMS DISSOLVING WHEN VARNISHED.

WE have received many complaints of the frequency of this annoyance of late. The circumstance which makes it most annoying is the fact, that the peculiar class of collodion which yields such films is often that which gives the finest negatives, and the photographer stands aghast at witnessing some especially fine picture break up, run into streaks, and disappear before his eyes. Our readers are aware of the usual remedies, such as avoiding the use of a spirit varnish, using instead those in which benzole or chloroform are the solvent, or the coating of the plate before drying with dilute gum water or albumen. There are certain objections, it is true, to the remedies: chloroform, or benzole varnish, rarely afford as perfect a protection to the film, being less hard than spirit varnishes; and gum water, besides being troublesome, having sometimes a tendency to flake off. Albumen is, perhaps, the best application for the purpose.

We have, however, one or two other suggestions to make. Carefully avoid a spirit varnish which smells of wood naphtha, as this substance, being a ready solvent for pyroxyline, is almost certain to dissolve the film; and being a good solvent for resins, and cheap, it is much used in the manufacture of the commoner class of spirit varnishes.

Perhaps the best suggestion we have to offer on the subject is one recently communicated to us by Mr. Spiller. In the photographic department at the Royal Arsenal, Woolwich, several negatives had recently been lost on varnishing; the sample of collodion in use, although very excellent in other respects, was of that quality which readily dissolved in strong alcohol, especially by the aid of heat. After trying various plans to surmount the difficulty, it was finally discovered that if the varnish were applied to the film quite cold, no solution took place; but the varnish was, of course, "chilled," and dried grey and opaque. The alcohol being evaporated, however, the plate was next held to the fire, and the layer of gum resin which covered the plate as a dead grey film, now melted, and gave a clear transparent varnish, without the slightest risk to the collodion film or the image. Sometimes the film of varnish will look a little less brilliant than if it had been applied with heat in the usual way; but this makes no practical difference in the printing.

PHOTOGRAPHS IN PRINTING INK.—Mr. Pouncy has made some recent improvements in his printing ink process, which enables him to reduce the exposure to that of ordinary silver prints.

THE PHYSIOLOGICAL EFFECTS OF CYANIDE OF POTASSIUM.

BY AUGUST BUSCH.

Cyanide of potassium has been mentioned several times lately in these pages, and I think the Editor of the Photographic News has done well in drawing the attention of his readers occasionally to the dangers which attend the use of the article.

Many times, on seeing people handle it, I have thought they could not be well aware of the dangerous nature of the compound, and of the injurious effects it has on health, even if not present in sufficient quantity to prove mortal; so I think it can do no harm if I recapitulate some of the consequences of breathing in an atmosphere more or less charged with prussic acid, and of touching the cyanide of potassium itself.

If cyanic acid be inhaled pure, unmixed with air, instantaneous death is the consequence.

In the chemical laboratories where prussic acid is manufactured, the assistant who conducts the process must take the greatest care in breathing, if he inhale a little too much of the escaping gas, he feels his eyesight suddenly leave him and he is in complete darkness: then he has to retreat quickly or he will fall on the floor.

Electroplaters and gilders, who have to work constantly over strong solutions of cyanide of potassium, feel, after a time, if their working room be not well ventilated, many very bad effects from the poisonous exhalation. Listlessness, weariness in the limbs, dimness of sight, deafness and loss of memory, are some of the effects produced; painful, obstinate ulcers break out on different parts of the body, especially on the hands, when these have been immersed in the fluid.

Strong cyanide of potassium, when applied to an open blood-vessel, is deadly; applied to a broken skin, it produces great pain, and generally a bad ulcer, and if applied to a whole skin for any length of time it must have the same consequences, especially if that skin be already decomposed by nitrate of silver, for it must be remembered that the elements of cyanide of potassium are so ready to part with each other, that not only the cyanic acid acts as if it were free, but the potash acts like free caustic potash, viz., dissolves skin, fat, &c., and leaves the deadly poison at liberty to act upon the blood-vessels underneath.

It is, therefore, proper to advise photographers again and again—

1st. To keep their sulphuric, nitric, and muriatic acid bottles far enough from the cyanide of potassium.

2nd. To have their dark rooms always ventilated as perfectly as possible.

3rd. To rather show the stains of honest work, than allow themselves to be rendered unfit for work by employing so dangerous a detergent; but if they *will* apply cyanide to clean their hands, never to do so where the skin is broken, nor, if the skin is whole, to continue the operation long, and always to rinse well with water afterwards.

The fact that most of the commercial cyanide is largely adulterated with carbonate of potash, does not lessen at all the danger of employing the article, it merely compels the photographer to buy three pounds of cyanide of potassium to do the same amount of work for him that one pound ought to do.

14, *Clifton Crescent, Asylum Road.*

THE EXHIBITION OF THE ROYAL CORNWALL POLYTECHNIC SOCIETY, 1864.—THE PHOTOGRAPHIC DEPARTMENT.

The great advances made in photography during the last few years induced this society, at their exhibition of 1863, to initiate a separate department for the display of works by this comparatively new and interesting art, and the offering their first silver medal for the best photograph exhibited, with other prizes at the discretion of the judges, caused a good show of pictures to adorn the walls. For the next and succeeding years we would suggest to the worthy and indefatigable secretary, Mr. Sydney Hodges, the advantage of placing the department in a better position as regards light; in fact, it would be a benefit to both if it changed places with that of the amateur in oil and water, whose somewhat crude efforts in drawing and colouring would then be toned down by the dull and uncertain light under the galleries, and by the change the richness and microscopic detail of the photographs would be seen to the advantage they deserved, and we think the general effect of the exhibition, as a whole, would be enhanced.

Notwithstanding the extreme shortness of notice, the department this year was well represented in the number and goodness of the pictures, if not in the number of contributions. The first name in the catalogue is that of Mr. Brooks, of Penzance, who was awarded a second bronze medal for two frames of stereograms of the scenery of our Cornish coast. The excellence of these views are indisputable. The "Chapel Steps" (St. Michael's Mount); "Bleu Bridge;" "The Land's End;" "The Breaking Wave;" "The Rill" (Lizard); "Zawn Pygal Nangizel;" and "The Lion Rock, Kynance," are especially noticeable, and would not have disgraced the hands of Wilson, England, or other of the first masters of this branch of the art.

J. H. Morgan, Clifton, Bristol, follows with twelve charming views of park scenery, studies of trees, &c., although there are several we should have been better pleased with had they been less warm in colour. The first bronze medal was the award.

We now come in our walk to the gem of the collection—"Autumn," a composition from several negatives, by H. P. Robinson, of Leamington, but it has been so well and truly described in your own pages, and those of your contemporaries, that it has acquired a world-renowned fame. The opinion here was divided between the grandeur of this picture and the sweetly beautiful 10×14 vignette by the same artist, "A Warwickshire Lane," well described in the pithy remark of a photographer present, that it was about the *cleanest* picture he had ever seen. Mr. Robinson also sent his "Interior of a Studio," "Brenda," and "A Welsh Girl," which have also been previously noticed in your pages. To "Autumn," as the best photograph exhibited, was awarded the first silver medal.

W. H. Cox, an amateur of Cadgurth, received a second bronze metal for his studies of fishermen's boats, but the manipulation of these pictures were not so effective as the choice of subject was artistic, being very flat and *bricky* in colour. Mr. Vernon Heath exhibited twenty-one frames of pictures, among which was a coloured group of their Royal Highnesses the Prince and Princess of Wales, and the infant Prince Albert Victor, views of Windsor Castle and its Park, Sandringham, &c., and better specimens of foliage photography we have never had the pleasure of seeing, richly deserving a place in the portfolio of the collector, the studio of the artist, or the lesson book of the drawing master. To this collection the second silver medal was awarded. Some good specimens of coloured enlargements were shown by J. Hart, Plymouth.

The next exhibitor in the catalogue is Mr. W. G. Barnett, of Falmouth, over whose productions it were a charity to draw a veil, while we turn with pleasure to the beautiful vignettes of W. E. Debenham and T. R. Williams, both of Regent Street, London, and also a frame of cartes by the latter gentleman, which a local paper describes as the best ever exhibited in the west, which opinion the writer is most happy to indorse. Mr. Williams, in these pictures, eschews that tardy theatrical scenery, so much now—unfortunately for good taste—in vogue, but his productions arrived so very late, that they were not in time to be unpacked for the view of the judges.

Messrs. Helsby, of Liverpool, exhibited a frame of nine

pictures, likenesses by a new process on enamel. To Mr. R. P. Yeo's views of Lanhydrock, the residence of T. J. A. Robartes, Esq., M.P., was awarded the second bronze medal. Mr. J. F. Trull exhibited some very good vignetted cartes. With this we conclude our notice of this exhibition, which we hope next year to see excelled, not only in point of numbers of pictures, but of contributors, and while we hope again to have the pleasure of seeing the production of exhibitors of the present year, that other names well known in the photographic world may appear in the catalogue and prize list. Δ.

THE MANUFACTURE OF CHLORIDE OF GOLD.

THE following method of preparing chloride of gold by Mr. Francis G. Eliot appeared a in contemporary a few weeks ago. There is so much that is useful and interesting in the communication, that we have pleasure in giving it publicity for the benefit of those of our readers who may be disposed to attempt the manufacture of their own chloride of gold. We may have a few other particulars with which Mr. Eliot has favoured us in addition to his original communication. The cost of the chloride of gold he produces is greater, he informs us, than the price of the commercial article; but it tones three times as many prints as any sample which he has been able to buy. This is no doubt due, in addition to the absence of any contamination, to the fact that it is perfectly neutral. One of the greatest draw-backs to many commercial samples, is the uncertain quantity of acid they contain, and thus in using them the proportion of any alkaline salt which may be used, which is sufficient to produce an admirable toning solution with one sample, is sufficient with another to render inert and useless a large proportion of the gold present. Mr. Eliot's preparation, when in a neutral ten-grain solution is of rich red colour, and will keep without precipitation of the gold for two or three months, even in the light; but we recommend photographers for safety always to keep gold solutions in the dark. If Mr. Eliot's instructions be carefully followed, we believe no failure need occur; but it is only right to remind those of our readers not accustomed to chemical manipulations that the exercise of great care and intelligence is necessary, as the experiment is an expensive one in case of failure. Simple as the means of success appear to a skilled hand, it is a fact that we have received very many records of failure from experimentalists, who state that they have observed all the conditions of success. Let first attempts therefore be with a small quantity of gold. We now subjoin the chief part of Mr. Eliot's communication, as it appeared in the *British Journal*:—

Having made chloride of gold ever since the early days of the daguerreotype, in which it was of equal importance to have this indispensable article in the greatest perfection, in combination with hyposulphite of soda, for fixing the pictures, and having, possibly, since that time dissolved some hundred pounds' worth of gold, and practically used a great portion of it in the various establishments in which I worked as an assistant, will plead as a reason if I am rather dogmatic in insisting on my formula being the best, contrary to the generally-received opinions of the trade, some of whom manufacture an article quite as much for *sale* as for use. The principal opinion which I hold is, that this article, in the best state for photographic purposes, cannot be prepared so as to be sent out in a dry or crystalline state, but must be kept in a state of solution.

Chloride of gold in the best state for toning, as far as regards *rapidity* in giving colour to the prints, *depth* of colour, freedom from mealiness and richness of deposit, is a *highly deliquescent, non-crystallizable* salt, and, therefore, ought only to be sold in stoppered bottles in a state of solution.

My method of manufacture is as follows:—I generally dissolve three ounces of what is known by the assayers as fine gold. Any other quantity, more or less, can be taken, suiting the proportion of acids accordingly. Putting these three ounces in a glass flask I pour upon them four fluid ounces of hydrochloric, and one fluid ounce of nitric, acid.

I am rather particular in these proportions of the two acids. There is less nitric to the hydrochloric in my receipt than is usually recommended. It is very possible that some of the hydrochloric acid may be wasted and lost by having this excess of it; but the chloride of gold is never so good if the ordinary proportions of one of nitric to three of hydrochloric acid be adopted.

I add no water, but simply allow them to digest spontaneously in the summer. In winter they will require a slight warming; placing the flask on a small block of wood on the kitchen boiler will be sufficient.

In twelve hours these acids, which will have become saturated with gold, may be poured off, and a similar quantity put in the flask; in another twelve hours do the same, only putting in half the quantity of the mixed acids, namely, half an ounce of nitric and two of hydrochloric, which will complete the dissolution of the gold.

The whole solution of gold is now to be put into a large *thick* Wedgwood-ware evaporating basin, and placed over a common ring gas stove—which I prefer, as I can regulate the heat to a nicety—and the contents evaporated until the whole becomes a solid mass of crystals. I generally set my evaporating apparatus going early in an afternoon, so as to reach this state at night. I then put out the light' cover the basin over, and let it repose all night, as our foreign friends say.

Now comes what I consider the most important part of my process. Early the next morning, taking the basin, I pour on it two or three ounces of water, and lighting the gas again I continue the evaporation at a low heat all day, and, as it reaches the point of solidification, add a little quantity of water. This is repeated five or six times in the course of the twelve hours, and each time there is an alteration in the appearance of the chloride of gold.

At the first evaporation it appears in a well-defined crystalline form, but after each evaporation the crystals get smaller and smaller, until at last it assumes the form of a blood-red, amorphous, and granular mass, which, directly the basin gets cold, begins rapidly to run to liquid, so that it is quite impossible to weigh it out so as to put it into bottles.

Calculating, therefore, that the three ounces of metal will make about 2,200 grains of chloride, I wash out the contents of the basin, the stirring rods, &c., with twenty-two ounces of water and pour into a stock-bottle, which of course gives me twenty-two ounces of solution of gold at 100 grains to the ounce.

To prepare this for use, I first reduce it to ten grains to the ounce, by adding nine ounces of water to every fluid ounce af the 100-grain solution (thus adopting the decimal system which I find most convenient in practice), and add a good teaspoonful of common washed whiting to the bottle.

After remaining for about four or more days, occasionally shaking, the solution is of a deep orange colour, and if poured carefully off, and the last portions filtered, will keep without reduction for a month or more.

It is now in an excellent state for most of the usual toning receipts, but especially suited for the *lime*-toning bath, made either from acetate of soda and chloride of lime, or a mixture of both.

Many operators have complained of a want of success in the new chloride of lime process. I think that can be easily explained by the article they have used for chloride of gold.

The way this is manufactured on a large scale for sale is as follows:—The metal is dissolved in a large quantity of mixed acids (with an excess of nitric), more than sufficient for its solution. The dissolved gold is then placed in a large evaporating basin, and a workman stands over it with a tub of washing soda by his side. He then with one hand takes up handfuls of this, which he throws in, stirring it all the time with a rod in the other. His test for ascertaining that he has added enough is when it ceases to "*fiz*," as he calls it, which is the only *scientific* term which he is acquainted with to describe or explain the appearance. The whole is now evaporated down to a solid mass, weighed out, and put up in little bottles for sale.

Conscientious manufacturers, however, do take the trouble to test a drachm of it, to see what percentage of metal it will contain when dissolved, and, having found out this, they guarantee it to contain so much accordingly.

Now, I would ask my brother photographers and printers what good can more than 50 per cent. of chloride of sodium and nitrate of soda do in the toning bath? Are they even harmless? I think not. I have always found that the more chlorides in the toning bath the slower the action, the weaker the deposit,

and, consequently, greater loss of definition in the print before it gets fully toned.

I cannot help thinking, from practical experience, that no more chlorides should be in the bath than are actually required for accomplishing the necessary decompositions which take place within it. It is very true that a definite sodio or potassio-chloride of gold can be obtained; but not by the way I believe it is usually manufactured. The acid solution of gold should be crystallized by evaporation, and then re-crystallized several times in order to obtain a pure article of definite composition.

If this would add too much to the expense of manufacture, then the better plan is to make a plain chloride, as pure and free from acids as possible, by the method I adopt, namely, using excess of hydrochloric acid to dissolve the metal, and driving off that excess by a long slow evaporation which requires hardly any attention; and then rendering perfectly neutral by common whiting, after which it will keep for several months perfectly free from reduction of the metal.

As photographers must still continue to use this valuable metal until the time when gold and silver will be both banished from our printing laboratories, I trust this communication may add somewhat to our knowledge of this indispensable article.

ON THE CHEMICAL ACTION OF LIGHT.

BY PROFESSOR ROSCOE.*

THE direction of progress, which is chiefly characteristic of modern science, is, without doubt, the gradual establishment of the principle of the conservation of energy. This great landmark in science teaches that a loss or destruction of force is as impossible as a loss or annihilation of matter; that all the exhibitions of activity going on around us are but changes of one form of energy into another, and that, therefore, the various forces, such as mechanical action, light, heat, electricity, magnetism, and chemical action, are mutually convertible, any one being capable of expression in terms of any other. The proof of the correlation and equivalence of the various forms of energy has been the work of some of the foremost minds of the century, and, thanks to their labours, we are now able to express the value of heat, electricity, magnetism, and chemical action in terms of common mechanics measured by the ordinary method of a weight raised through a given space. In the case of heat and mechanical action, especially, has this mutual equivalence been made apparent, and the fact that heat is but a mode of motion has been rendered plain, even to the general public. We are able not only to measure heat, relatively with the thermometer, but absolutely in terms of our mechanical unit. We are now acquainted with the total amount of that life and force-sustaining radiation emanating from the sun, without which our earth would be a cold and barren mass, devoid, not only of the animal and vegetable life with which it teems, but of the slightest breath of wind, and the smallest drop of rain. We now know that the quantity of heat emitted by each square foot of the sun's surface every hour, is equal to that generated by the combustion of 1,500 lbs. of coal, or, expressed in a mechanical measure, this energy equals that work done by 7,000 horses. If we then remember the sun's magnitude, such that its radius is larger than the distance from the earth's centre to that of the moon, we can form some idea of the enormous quantity of energy which is thus poured forth into space. The portion which falls upon the earth's surface of this enormous amount of heat, although it creates nearly all the motion, and supports all the life with which our earth abounds, is but 12,300,000,000th part of the total quantity emitted by the sun. This vivifying solar radiation of heat is very unequally distributed over the surface of our planet, mainly owing to the absorption effected by the atmosphere, giving rise to those differences of temperature producing the variety of climate seen on the earth's surface.

These rays, which especially act to bring about change of temperature, are however, not the only portions of the sun's radiation which produce effects upon the surface of our planet; we find, in addition, rays which produce little heating effect, but which affect the eye, and are termed rays of light, and we discover the existence of rays which are especially characterised by their power of effecting the decomposition of certain chemical substances, and hence have been called the chemical rays. If we decompose the white sunlight into its component parts, we find that the heating rays are the least refrangible, the maximum of heating effect being produced at a point extending beyond the limits of the visible red, whilst the heat-producing power of the spectrum gradually fades away as we go on, and is scarcely perceptible in the violet. Passing onwards, we see that the maximum of the light-giving rays exists in the yellow; this portion of the spectrum appears brightest to our eyes, whilst it fades off in intensity to either side. Further on, we meet with a new class of rays which possess very little heating power, and do not affect the eye strongly, but yet possess very remarkable property, viz., that of decomposing certain chemical compounds. We must, however, not forget that there is no difference of kind between these various rays; the heating rays and the chemically active rays only differ from each other, as the red and the yellow rays differ, viz., in wave, length, and intensity of vibration. Although the total amount of the heat derived from the solar radiation has been measured, no method has, as yet, been generally adopted for measuring separately the varying amount of the chemically active portions of this radiation, and we are, therefore, unacquainted with the distribution of these chemical rays over the earth's surface although, as we shall see, they are of primary importance, as determining, to a great extent, the plant and animal producing power of a country. My object this evening in the discourse which I have the honour of delivering, is to point out the interest and importance attaching to these chemically active rays, and to describe a method of measuring their varying intensity at any given spot upon the earth's surface, which, although it does not reduce these actions to the mechanical standard, gives us a relative measure for these rays, corresponding to the thermometric measurement of heat.

Let me in the first place endeavour to give you some examples of the chemical action effected by light. I need do no more than refer, as a familiar example, to that most beautiful of modern arts, photography, illustrating, as it does at once, the simplest and the most complicated of the chemical actions of light. The simple actions consist in the decomposition of silver salts, chloride, bromide and iodide by the light, in the blackening, for instance, of photographic paper in the sunlight—the most complicated of the actions are exemplified in that wonderful latent image formed upon the sensitive plate; the light having effected upon the chemical constituents a change which is invisible, even under the microscope, but which enables them to decompose when brought under the influence of certain deoxidising agents—the developers of the photographers. The theory of the photographic processes is, at present, in its earliest infancy. The art has progressed far; but, as is usually the case, the science follows only slowly. We know little about the composition of even the visible image; we know nothing about the kind of decomposition which occurs in the formation of the latent and invisible image, nor are we acquainted with the scientific explanation of the employment of the various reagents used amongst photographers. A second illustration of the chemical action of light is the combination which light effects upon a mixture of the two elementary gases, chloride and hydrogen. I hold in my hand a small glass bulb filled with a mixture of exactly equal volumes of chlorine and hydrogen. These gases will remain for any length of time in contact without the slightest combination ensuing, if they are kept in the dark and kept cool; expose them but one second to the direct sunlight, and combination ensues so rapidly that a sharp explosion occurs, owing to the great heat which is evolved. I have here the power of producing a light so rich in the chemically active rays that the result will be the same as if I threw the bulb into the sunlight. I wish next to illustrate the fact that only those of the sun's rays which exist at or near the violet end of the spectrum have the power to act thus chemically. The light evolved by phosphorus burning in oxygen contains so much chemically active light that it will explode the bulbs of chlorine and hydrogen. If, however, I burn the phosphorus in a globe of red glass, the chemically active blue rays cannot pass—they are all absorbed by the red colouring matter of the glass, and the bulb exposed to this light will not explode. If, on the other hand, I burn the phosphorus in a similar globe made of blue glass, the highly-refrangible blue rays will pass through, and falling upon the chloride and hydrogen bulb, it will explode.

The lecturer here illustrated his remarks by the action of phosphorus burning in oxygen, which, acting on the gases, produced an instant explosion. A red glass shade being placed over the light, the bulb then exposed remained without

* A Lecture delivered before the British Association, at Bath, Sept. 16th.

any trace of action; a blue glass shade was then tried, but, owing either to deficiency of light, or some defect in the quality of the blue glass, no chemical action was produced on the gases. At a subsequent period of the evening the light from burning magnesium wire at once produced chemical action, and an explosion followed. The lecturer then proceeded:—

As a third and last example of the chemical action of light, I would refer to the relation in which the chemical rays stand to vegetable life. If we examine the chemical constitution of vegetables, we find that they consist almost entirely, although the other constituents are necessary, of carbon, hydrogen, and oxygen—substances all contained in the atmosphere. When vegetable matter is destroyed by oxidation or burnt, carbonic acid and water are formed and heat is evolved. It is upon this heat alone that animals exist; all their energy is thus heat thrown into other channels, and their forces are derived from those locked up in the vegetable organisms upon which they feed. Whence is this heat derived? How do plants then accumulate this store of energy? They obtain it from the sunlight. The plant absorbs the rapidly vibrating solar radiations, and stores them up ready to be again given out in various forms of energy when the vegetable organism is destroyed by oxidation. It is the sunlight which, acting upon the green colouring matter of leaves, decomposes the carbonic acid of the air into its constituent elements, enabling the plant to assimilate the carbon, and to turn the free oxygen back into the air for the subsequent use of animals. But, in this case, as with the chlorine and hydrogen, it is only the most refrangible, the blue portions of the sun's rays, which are able to effect this decomposition. I can illustrate this power which the green leaves possess of absorbing the chemically active rays, whilst leaves, destitute of that colour, allow the rays to pass through them without effecting any chemical decomposition. I have here some leaves of the variegated mint; a portion of each leaf is green, and a portion colourless. Both portions are equally transparent to common visible light, as we see when we throw the image of the leaves on the screen, by means of the lantern.

Here I have a sensitive photographic plate, and I will place the leaves upon the sensitive surface, and then expose the leaves to a strong light, so that the rays must pass through the leaves before they reach the plate. I can show you that this light of burning magnesium wire possesses powerful chemical action, as it immediately causes a bulb of chlorine and hydrogen gases to explode when brought near. On developing the latent linage produced, we shall see that none of the chemically active rays have passed through the green parts of the leaves to the sensitive plate, whilst the white portions have proved transparent to the chemical rays, and the film has, in those parts, been decomposed. Hence, too, in photographs, the leaves of trees, through which the light has been transmitted, appear black, whilst the leaves, from which the light is reflected from leaves, contain chemical rays, produces the proper effect.

I need not enlarge upon the importance of our possessing a knowledge of the distribution of these rays on the earth's surface, when we remember that vegetation depends on these rays for its growth, and that the amounts of the chemical rays falling on a different spot are by no means proportional to the amounts of the heat-producing rays as measured by the thermometer. As the measurements of temperature on the earth's surface give rise to isothermal and isotheral lines, measurements of the chemical action of light at various points will give rise to curves of equal chemical intensity, and thus we shall obtain a truer measure of the climate than we possess at the present time.

The method of measurement of the chemical action effected by the total sun and daylight, which I shall endeavour to explain, is, I believe, now so far perfect that it may be introduced for practical registration in meteorological observatories. The instrument which I hold in my hand is all that is needed for making the observations, and the curves of daily chemical intensity upon the diagrams (to which I shall again refer) show the kind of results thus obtained. For some years I have had the pleasure and advantage of being associated in a series of researches upon the measurement of the chemical action of light, with a man whom I am proud to number amongst my most intimate friends—Professor Bunsen, of Heidelberg—and to him I am glad to be able to ascribe the merit, if such be found, in the method which I shall endeavour to make plain to you. This method consists in the exact estimation of the time which a photographic paper of a constant degree of sensitiveness requires to be exposed to light in order to attain a certain given tint, it being ascertained that this same tint is always produced when the same amount of light falls upon the sensitive paper. Hence it was necessary to construct an apparatus in which photographic sensitized paper could be exposed to the sunlight for definite times measured by small fractions of a second. This instrument consists essentially of a pendulum, vibrating about three-quarter seconds, by whose oscillation a sheet of darkened mica is withdrawn from, and brought back over, a horizontal strip of paper prepared with chloride of silver, and placed in a constant position relative to the pendulum and sheet of mica. The time during which each point in the length of the strip is exposed is different, and the time of exposure for each point can be calculated when the length and position of the strip, and the duration and amplitude of the pendulum's vibration are given. The strip of sensitive paper presents, after exposure, a gradual diminution of shade from dark to light, and for each shade the time of exposure is known. In order that such a graduated strip may serve as a means of measuring the chemical action of light, we require—

1. To know the relation existing between the several tints and the intensity of the light necessary to produce such tints.

2. To construct sensitive paper which shall always possess the same degree of sensitiveness, and can easily be prepared when required.

It was found by a long series of experiments, that it was possible, by adhering strictly to a certain method of manipulation, to prepare standard papers, which, when made, possess a constant degree of sensitiveness, so that if the same light falls upon them, the papers are always coloured to the same tint. Experiment, likewise, showed that the tint attained by such a paper was constant when the quantity of light falling upon it also remained constant; so that light of the intensity 50, falling upon the paper for the time for 1, produced the same blackening effect as light of the intensity 1 falling upon it for the time 50. Knowing this law, which regulates the degree of shade of the paper, and having a surface of a perfectly constant degree of sensitiveness, it is easy to obtain absolute measurements of the chemical action of light. For this purpose an arbitrary unit of measurement is chosen, by making a standard tint which can be easily and exactly reproduced at any time. The quantity of light which shall, in a second, or unit of time, produce a blackening effect on the standard photographic paper equal to that of the standard tint, is said to have the chemical intensity. If the time needed to produce this same tint is found, by experiment with the pendulum photometer, to be two seconds, then the chemical intensity is one half, and so on. All that is needed, in order to obtain accurate measurements of the chemical action of diffused daylight or sunlight, is to be able to find the time necessary to effect a blackening of the normal paper, equal in shade to the standard tint. This is done by means of the graduated strip made in the pendulum photometer.

For the purpose of accurately comparing these tints, the ordinary daylight, or even lamplight cannot be used, as a change would thereby be produced on the sensitive paper. A light which does not act chemically must be used; such a light is the monochromatic soda flame. I can easily show you that the yellow soda flame contains no chemically active rays; for, as you see, its spectrum consists of one bright yellow line, devoid altogether of the power of decomposing the salts of silver. I cannot look upon this splendid yellow line without referring to the grand discovery of which this line has proved the keystone. I mean that of the chemical composition of the solar atmosphere by Kirchhoff. By observing the coincidence of this bright yellow line with the dark solar line D, and by reversing it, Kirchhoff was first led to the proof, soon afterwards rendered certain, of the actual existence of iron, magnesium, calcium, and other metals well known on this earth in the sun's atmosphere, at a distance of ninety-one millions of miles. The light from this flame possesses another advantage; namely, that the unavoidable differences of colour are not seen; variations in shade alone being perceptible. By help of this soda flame, the coincidence of shade of the graduated strip with the standard tint, can be read off with the greatest precision. In order to measure the chemical intensity of the daylight at any time, all that is needed is to expose a strip of standard paper in the pendulum photometer for a given number of vibrations, and then to find upon the strip thus exposed, the point at which a shade equal to the standard tint has been produced. Reference to a table gives the time of exposure necessary to produce this tint, and the reciprocal of this time represents the intensity of the acting light. If the time necessary were three seconds, the chemical intensity would be one-third; if the time were half a second the

intensity would be two. In this way curves of daily chemically intensity have been obtained, which show the variation caused by clouds, or by the changing altitude of the sun. These curves show maxima and minima exactly corresponding to the appearance and disappearance of the sun behind a cloud. The difference between the sun's chemical intensity in summer and winter is thus also depicted. Based upon the principles of the pendulum photometer, a much simpler method of making these measurements has been arranged as follows:—A graduated strip made in the pendulum photometer, is fixed in hyposulphite of soda, and pasted upon a board furnished with a scale. The shades of certain points on this fixed strip, are compared with the shades on given points upon a graduated strip, prepared in the usual way, and not fixed in hyposulphite. The fixed strip is thus calibrated in terms of the unit of measurement, and it may then be used as a means of measuring the chemical action of light. Small pieces of the standard paper are then exposed for a given time to the light which it is desired to measure, until the shade approaches that of a part of the fixed strip. The point of exact coincidence is then read off by the soda flame as usual. In this way, a piece of standard paper of one square inch of area, will serve for 20 separate determinations, and the whole arrangement for exposure may be carried in the pocket.

Determinations of the chemical action of the total daylight have thus been made at Manchester, at the most widely differing seasons of the year, and continued on consecutive days for a month. The diagrams on the screen show the nature of the results so obtained. In the first place, let us notice the difference in the amount of chemical action effected by a cloudy and upon a cloudless day, the curve of the former is low, and the action does not rise above 0·18, whilst that for the latter is high, extending to 0·50 units. The sudden variations, too, of the chemical action which occur when the sun is obscured by a cloud, and again appears, are distinctly seen in the curves; the chemical action then falls, as it were, down a great precipice, and rises as rapidly when the sun shines. We also see the great difference which exists between the chemical action of sunlight in summer, autumn, and winter. On this diagram we have the curves of chemical action effected at Manchester on the summer and winter solstice and at the two equinoxes. From these curves we can estimate the relation between the chemical action of the above rays, and we find that if the chemical action on December 22nd, 1863, be taken as the unit, that on the autumnal and vernal equinox was 6·01, and that at the summer solstice (June 22nd, 1864) was 18·56.

The curves on the third diagram exhibit the chemical action occurring simultaneously at Heidelberg, at Manchester, on July 4, 1864. It was not a very fine day at Manchester when the observation was made—not an unfrequent occurrence, I believe. From these curves the great difference between the chemical brightness at two spots on the earth's surface, separated by less than 4° of latitude, can be seen, the total chemical action at Heidelberg on the above-mentioned day being more than three times as great as that at Manchester. If this method prove capable (as I expect it will) of general adoption for purposes of meteorological registration, we may look forward to obtaining from such observations very interesting information respecting the relative distribution of the chemical rays over the earth's surface.

As another example of the measurement of the chemical action of light, I may mention that of the comparison of a terrestrial source of light with that of the sun. The light emitted by burning magnesium wire is exceedingly rich in chemical rays —so much so that this light may be used instead of sunlight for the purposes of photography. As an illustration of this I will endeavour, with Mr. Brother's assistance, to take a photograph of our President, if he will kindly permit me to do so.

Sir Charles Lyall here took a seat in front of the white board, and, by the light of burning magnesium wire, a negative was taken by Mr. A. Brothers, of Manchester, from which a transparency was obtained in sufficient time to enable a capital positive to be thrown upon the screen by the aid of the oxy-hydrogen light before the audience dispersed. The result was loudly cheered.

The spectrum of burning magnesium is exceedingly rich in violent and ultra-violet rays, partly due to the incandescent vapour of magnesium, and partly to the intensely-heated magnesia formed by the combustion. So long ago as 1859 the chemically active power possessed by this light, compared with that of the sun, was determined, and the use of this light for the purposes of photography was proposed. It was shown that a burning surface of magnesium wire, which, seen from a point at the sea level, has an apparent magnitude equal to that of the sun, effects on that point the same amount of chemical action as the sun would do if shining from a cloudless sky at a height of 99° 53′ above the horizon. On comparing the visible brightness of these two sources of light, it was found that the brightness of the sun's disc, as measured by the eye, is 524 times as great as that of burning magnesium when the sun's zenith distance is 67° 22′; whilst at the same zenith distance the sun's chemical brightness is only five times as great. Hence the value of this light, as a source of the chemically active rays for photographic purposes becomes at once apparent. In the memoirs published in the above year it is stated that the steady and equable light evolved by magnesium wire burning in the air, and the immense chemical action thus produced, render this source of light valuable as a simple means of obtaining a given quantity of chemical illumination, and that the combustion of this metal constitutes so definite and simple a source of light for the purposes of photo-chemical measurement, that the wide distribution of magnesium becomes desirable. The application of this metal, as a source of light, may become even of technical importance. A burning magnesium wire of the thickness of 0·297 millimetre, evolves as much light as 74 stearine candles, of which 5 go to the pound. If this light lasted one minute, 0·987 metre of wire, weighing 0·120 grammes, would be burnt. In order to produce a light equal to 74 stearine candles burning for ten hours, whereby about 20 lbs. of stearine is consumed, 72·2 grammes (2½ ounces) of magnesium would be required. The magnesium wire can be easily prepared by forcing out the metal from a heated steel press having a fine opening at bottom; this wire might be rolled up in coils upon a spindle, which could be made to revolve by clockwork, and thus the end of the wire guided by passing through a grove or between rollers, could be continually pushed forward into a gas or spirit lamp flame, in which it would burn.

The manufacture of this metal is now carried on under Mr. Sonstadt's patent, by the Magnesium Metal Company of Manchester, and the light evolved by the burning wire is likely to be applied to very many technical purposes.

Some persons are sanguine enough to believe that it may be used for illuminating our streets, and I understand that the gentlemen who manufactured the metal have an application from the manager of the gas works at Rio de Janeiro, who seems to think it would be better for them there to light with magnesium wire instead of gas. I believe this is a serious proposal, but we can scarcely expect that it will be carried out in practice. In conclusion, I have only to thank you for the very kind way in which you have listened to me.

The lecturer exhibited a mass of the metal magnesium, weighing 20 lbs., and stated that a few years ago pieces weighing a few grains were rare and precious. He exhibited a lamp made for burning the wire continuously, which was, however, only a partial success. After the lecture Mr. A. G. Grant's lamp was examined, and appeared to give a more steady and continuous light without the intervention of a flame from a lamp to preserve ignition than the other did with one.

Various photographic experiments with the magnesium wire, such as the production of transparencies of leaves, as well as the securing of the President's portrait, were conducted during the evening, by Mr. A. Brothers, with great skill under difficult circumstances.

The spectra of various metals, illustrating the amount of actinic character they possessed, were exhibited during the evening.

PHOTO-SCULPTURE.

BY A. CLAUDET, F.R.S.*

IF in our time opinions are divided as to whether photography is finally to exercise a beneficial influence upon the fine arts, or the contrary, there is no question that its innumerable useful applications are a boon to the community.

After having been habituated to photography, we can scarcely suppose it possible to do without photography, as we might say of railways, or of the electric telegraph.

Photography may have been the enemy of all that was inferior in the arts of painting and engraving, but is that to be regretted?

* Read at the British Association, September 19.

Instead of the dabblers in portraiture who were satisfying a morbid taste, we have a great army of photographers capable of representing the human form and features in the utmost perfection. Printing itself, that universal and powerful aid of civilization, was only established by superseding a class of artists who had, at least, the merit of spreading by their work knowledge and literature during many centuries. They indeed produced *true works of art* which, though no longer repeated, are to be admired in the museums where they are preserved.

As to the art of painting, instead of being injured, it is served by photography, which enables artists to be more perfect in their design, and to study the beauty of forms yielded by the photographic mirror.

Photography, in multiplying marvellous representations of the beauties of nature, tends to inculcate the taste for artistic productions. There will be fewer bad painters because there will be less and less demand for inferior paintings. Fine works only will be esteemed, and the taste for art will increase in proportion to the value of its productions.

Is it not the same in literature? Who can deny that the more it is refined and pure, the more it educates and disposes the mind to reject whatever has not the stamp of genius?

In an enlightened age, inferior literature cannot exist. So the fine arts will be improved by photography. Notwithstanding the alarm of narrow minds incapable of appreciating progress, the discoveries which are based upon science will ultimately produce good, and benefit society. To the painter, photography affords the means of being absolutely correct in design. Reference to photographs in painting portraits, representing draperies, &c., saves immense trouble, and obviates the necessity of long and repeated sittings.

But how can it be said that photography prevents the artist from imparting to his work the impress of genius? Photography is for him only a useful auxiliary!

Nothing, however, can arrest the strides of photography; it extends every day its applications, and gradually invades every art.

Who would have expected that photography was to be the means of sculpture?

Yet, however extraordinary such a prognostication might appear, however difficult at first thought it may be to understand, the possible connection between flat representation of objects and their solid form, it has been proved that from flat photographs, a bust, a statue, or other object of three dimensions can be made by a mechanical process without the necessity of the sculptor's copying the original, or even seeing it at all. Yet the result is a perfect fac-simile of the original! Moreover the work is executed in one-tenth of the time required for modelling by hand.

This beautiful application of photography is called *Photo-Sculpture*, and is the invention of Mr. Willème, an eminent French sculptor.

Before explaining how Mr. Willème was led to this discovery, let me remind you that Photography itself was invented by painters of talent, by *artists*, who, while using the camera obscura for studying the subject of their intended pictures, were struck with the beauty of those natural representations. In contemplating them they naturally desired that the pictures could be permanently fixed. Considering that these pictures were formed by the light reflected from the objects, they essayed to fix them by availing themselves of the known scientific fact that light had the property of blackening certain chemical compounds.

The flash of that idea was enough; their genius and perseverance solved the problem, and they created that art which they desired so much—Photography!

A similar, and no less instructive story, may be told of photo-sculpture. Mr. Willème was in the habit, whenever he could procure photographs of his sitters, of endeavouring to communicate to the model the correctness of those unerring types. But how should he raise the outlines of flat pictures into a solid form?

Yet these *single* photographs, such as they were, could serve him to measure exactly profile outlines. He could indeed, by means of one of the points of a pantograph follow the outline of the photograph, while with the other point directed on the model, he ascertained and corrected any error which had been communicated to his work during the modelling. What he could do with one view, or one single photograph of the sitter, he might do also with several other views if he had them. This was sufficient to open the enquiry of an ingenious mind. He saw at once that if he had photographs of many other profiles of the sitter, taken at the same moment, by a number of cameras-obscuras placed around, he might alternately and consecutively correct his model by comparing the profile outline of each photograph with the correspondiug outline of the model. Such was the origin of a marvellous and splendid discovery. But it soon naturally occurred to him, that instead of correcting his model when nearly completed, he had better work at once with the pantograph upon the rough block of clay, and cut it out gradually all round in following one after the other the outline of each of the photographs.

Now supposing that he had 24 photographs, representing the sitter in as many points of view (all taken at once), he had but to turn the block of clay after every operation, 1/24 of the base upon which it is fixed, and to cut out the next profile, until the block had completed its entire revolution, and then the clay was transformed into a perfect solid figure of the 24 photographs—the statue or bust was made!

When this is once explained every one must be struck with admiration at the excellence of the process. It is so sure and so simple, that we are surprised it had not been thought of before. But so it is with the most valuable inventions. They wait until some genius grasps the idea, and conceives how to make them practical.

It will, perhaps, be argued as a defect of photo-sculpture, that, being the result of a mechanical process, it leaves no opportunity for the display of artistic taste or feeling, and that its productions must therefore be only vulgar and matter of fact. This would be a mistake; because the sculptor, who has to direct the last operation, will exercise his skill in communicating to the model all the refinement with which, as a sculptor merely, he could have endowed it. For supposing the photographs to have been deficient in attitude or expression, in giving the last touches to the model, the sculptor can correct those imperfections. The pantograph of photo-sculpture will communicate to the clay the true character and the proportions of the object, with all the correctness of the photographs; it will produce a perfect likeness, and it will be necessary to give to this first draught the softness and finish of a work of art. These of course cannot be imparted except by the skilful hand and the intellectual feeling of a true artist. In short, as the model must be touched by a sculptor, it is clear that the sculptor so engaged should be such as will not spoil the work of the unerring machine; but on the contrary, improve it in many particulars, and even add to it the sentiment of art. Therefore the process of photo-sculpture is to put in the hands of a skilful sculptor a model perfect in its proportions, correct in design, full of character, including draperies of the most elegant outlines, such as only are represented by photographs; and this model, so prepared for him, would have required a tedious labour with the disadvantage of much uncertainty.

As photography has been the means of improving the art of painting, so photo-sculpture is destined to improve sculpture, and to spread in all classes the taste for this noblest branch of the fine arts. It may be said that sculpture is understood only by a very limited number of educated minds. It is seen only in palaces, in the public galleries, and in the mansions of the rich. Good sculpture is very expensive, and for this reason it is not customary for the middle-classes to employ sculptors to execute busts or statuettes of relatives or friends. Besides the question of price, there are very few artists capable of producing such a work as shall be an inducement to the possession of this kind of similitude. Photo-sculpture, therefore, opens a new era by the advantages of its procedure. The work is done with greater accuracy, in a very short time, and consequently at a moderate price. The original has only to sit once for the photograph, and then in a few days, without further trouble, or the necessity of appearing repeatedly before the sculptor, a bust or statuette is produced. Such facilities cannot fail to make the demand very general, and this must cause the employment of a great number of artists. The "ateliers" of photo-sculpture are indeed *to be the best school of sculpture*, from which will issue a succession of skilful artists, who, having practised the mechanical process, will be able, when photographs cannot be obtained, to model by hand. Therefore the art of sculpture must in every way benefit from the practice of photo-sculpture, which, undoubtedly, we shall see honoured in the dwellings of thousands, not only as regards portraiture in general, but also as to the resemblances of those who by their genius and virtues have deserved our admiration and esteem.

Again, photo-sculpture will be the easy and inexpensive

means of reproducing in various sizes, and with unerring faithfulness, the beautiful remains of antiquo sculpture, whether statues, vases, or other objects which can only bo seen in museums and galleries, and thus the public can possess, at a small cost, copies, or rather fac-similes, of the great creations of past ages. Tho only copies existing of thoso works cannot often be repeated, for they must be made at some risk of injuring tho original, tho only process hitherto known being that of taking casts; hence they are expensive and rare. To obtain a certain number of photographs of theso precious relics is all that will bo needed for their reproduction by the photo-sculpture process.

Photography has already been tho means of copying the paintings of celebrated mastors existiug in public and privato galleries. By those photographs everyono is enabled to possess copies of the noblest works in the art of painting. These copies contain composition, design, and everything capable of conveying the feeling of the artist; but they are deficient in one essential—colour!

It is otherwise as regards the representation of statuary which leaves to the mind to imagino colour. Photo-sculpture has then the advantage of reproducing works in sculpture without depriving us of any of the attributes which have made them famous.

Photo-sculpture will further be applied to the representations of animals, showing them in true and natural attitudes; by this means faithful models will bo introduced in the manufacturo of porcelain, clocks, furniture, and much that contributes to the embellishment of our dwellings.

In a word, photo-sculpture is calculated to spread the taste for the beautiful in form; it opens a new era, which will be remarkable in the history of the fine arts.

I have thought that I could not give to the meeting a better illustration of the process of photo-sculpture than by executing the bust of our illustrious president, Sir Charles Lyell. I invited Sir Charles for this purpose, and he was kind enough to sit for his photographs on the 16th August.

The machine has done the work, tho sculptor has given the finishing touch to tho model, and here is the bust completed, Sir Charles not having seen it before I brought it to the meeting!

In so short a time I have also been able to obtain of tho same bust a model in bronze, and I leave to the meeting to form some opinion of photo-sculpture by this and other examples now near me.

At the conclusion of the lecture, Mr. Claudet illustrated, by means of a model, tho mode of working in photo-sculpture, and also exhibited a number of busts and statuettes produced by the process, which were examined with much interest.

CONTRIBUTIONS TOWARDS THE FOUNDATION OF A QUANTITATIVE PHOTOGRAPHY.

BY PROFESSOR ROSCOE, F.R.S.*

After remarking that the theory of photographic processes was, up to the present moment, in the first or quantitative stage, Professor Roscoe proceeded to describe some of the results of experiments undertaken for the establishment of a quantitative photography; the method being based upon the experimental law laid down by Professor Bunsen and the lecturer, to the effect that a constant product of the intensities of the acting light into the times of exposure, always correspond to a constant tint on the photographic paper. Hence if several prepared papers were exposed to a constant source of light for varying times, in order that they should all exhibit the same tint when examined by the soda flame, the relative sensitiveness of the papers would be represented by the reciprocals of the said times. To overcome the difficulty of exposing papers of varying sensitiveness for different times, until a uniform tint was obtained, the papers were all exposed the same length of time, and the different tints produced, read off upon a graduated standard strip prepared in the pendulum photometer, and the time calculated which each paper must have been exposed in order to bring them all to one tint taken as the standard.

* Abstract of a paper read before the British Association, Sep. 20th, 1864.

It had been previously ascertained that variation, between certain limits in the strength of the silver bath but slightly affected the sensitiveness, but that the strength of the salting solution had a most important influence in this direction. Papers prepared with varying proportions of chloride of sodium, and then excited on a 10 per cent. silver bath, and their degrees of sensitiveness recorded, that salted with a 1 per cent. solution being taken as the unit, and curves drawn indicating the relative sensitiveness of each of the other papers. A carefully tabulated statement of the progressive increase of sensitiveness, with each increase in the strength of the salting solution was then secured. The experiments were tried with the chlorides of sodium, potassium, and ammonium, but no variation in sensitiveness was found to arise from the use of the different metals, when the quantity of chlorine remained constant.

Experiments with iodides and bromides were also recorded, the former, however, even after long exposure, was not sufficiently affected to admit of satisfactory measurement of its sensitiveness, notwithstanding that in the formation of a latent image it is so much more sensitive than the other haloid salts of silver. Bromide of silver was found to be considerably more sensitive than chloride, and a mixture of bromide and chloride were found as sensitive as the bromide alone. A mixture of iodide and chloride was found to give a great accession of sensitiveness, and a mixture of equal parts of the three salts, chloride, bromide, and iodide, gave still more sensitive results. With a mixture of bromide and iodide a remarkable decrease in sensitiveness was observed, the retarding action exerted by iodide being analogous to the retarding action exerted by the traces of small quantities of foreign gases upon the sensitive mixture of chlorine and hydrogen; and probably belongs to that class of action to which the name of photo-chemical induction has been given.

The details of these interesting experiments will appear in our pages, when Professor Roscoe has completed and verified the results.

Professor Roscoe also read a paper on a chemical photometer for meteorological observation, and gave several of the results observed. The principle involved is the same as that upon which the quantitative estimate of photography is based.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, September 21st, 1864.

The President of the Photographic Union of Cadiz, announces a method of obtaining busts upon sepia-coloured grounds. A positive being taken in the usual manner, upon a white ground and toned, is dried in the dark, then returned to the silver bath for a couple of minutes, dried again, and exposed to light under a card which covers the picture excepting in those parts which it is desired to tint. It is finished in the usual manner by fixing in hyposulphite of soda.

Dr. Vogel, remarking upon the changes which the nitrate of silver bath undergoes while in use, by the accession of the ether and collodion from the collodion plate, leading to frequent failures, states that Mr. Osborne has found in the method adopted by Mr. Wharton Simpson, a very efficacious remedy for this kind of annoyance; this consists simply in employing a supplementary nitrate bath. The collodion plate being sensitized in the first bath, is drained, and then immersed in the second bath. The injurious presence of the foreign salts, ether and alcohol is thus reduced to a *minimum*, and the second bath impregnates the plate with a stronger and purer silver solution. This method gives excellent results. Doubtless, in the course of time, the second bath will become a little alcoholic; when very old it will

serve as a first bath, and a new one must be prepared as a second. It is during warm weather, especially, that the advantages of having two baths will be best appreciated To the very conclusive experiments of Mr. Osborne, confirmed by specimens that attest their accuracy, permit me, says Dr. Vogel, to add my humble remarks. The cause of most of the fogged, solarized, and other imperfect negatives is no other thing than the change in the silver bath, even the strongest, produced by the action of alcohol and ether introduced in a state of impurity. It has happened to myself, for instance, that in strongly heating a new bath deteriorated by alcohol and ether, to obtain at last a bath that would give opaque negatives only, although previously it gave excellent negatives. All organic substances react upon nitrate of silver, in the same way as alcohol and ether. If we put a little of a solution of sugar into the nitrate bath, it will exhibit at first no alteration, and work as well as usual; but after being heated to boiling point, it gives opaque negatives only. From its great simplicity, the method above described is of unquestionable utility.

Another question, says Dr. Vogel, no less interesting than the preceding, is the sensitiveness of chloride of copper. It is not very long since this singular property has been applied to photography, and experiments have already shown that in this application there are, perhaps, the elements of the realization of a great economy, which interests every photographer—the replacing of silver by a less costly metal, at least for negatives.

M. Grüne has for many years made experiments relative to this economical substitution, and he invites those who can furnish him with any information on the subject, to communicate to him the result of their observations and experiments. The problem is sufficiently important to all who are engaged in photography, to induce them to contribute everything they can to its solution.

PHOTOGRAPHY WITHOUT A NITRATE BATH, AND WITHOUT DEVELOPMENT.

Dear Sir,—In the last number of the Photographic News you describe a process for making negatives without a nitrate bath, the nitrate of silver being added to the iodo-bromized collodion. I beg to state that I have published a quite similar process in the *Photographisches Archiv*, of May 16th, and in *Le Moniteur de la Photographie*, and that this process has given good successes in the hands of several persons, in this and foreign countries.

I prepare the collodion in this manner:—Iodide of silver is precipitated and washed with distilled water, then dissolved in a saturated solution of iodide of potassium; then I take good uniodized collodion, prepared with *absolute* spirits; to this I add as much of the iodide solution as is necessary, in order to give a creamy dense film when poured on glass; of course, the iodide of silver is precipitated in the same moment as it is added to the collodion, and makes it opalescent, milky white.

This mode of introducing the iodide of silver into the collodion I have selected, and I prefer to any other mode, because the iodide of silver precipitated in this manner is much more finely divised than that precipitated by mixing solutions of nitrate of silver and iodide of potassium.

The collodion is to be poured on a glass plate, washed with pure water, covered with tannin, exposed and developed in the manner you describe. I also have developed several plates with a mixture of iron and ammonia developer with nitrate of silver solution. These negatives were very clear, but not dense enough, and had to be intensified afterwards. The collodion containing iodide of silver does not change; at least, I have obtained the same results with it when quite fresh, and when three months old.

I make use of this opportunity in communicating to you the curious results of some experiments I made to-day, and which prove that developing also is a thing which is not always necessary in the negative process. Indeed, I was much surprised when opening my dark slide, to perceive a beautiful dense negative on the film that I was going to develop. The development had taken place in the camera, a solution of gallate of lead having been mixed with the silver solution upon the film before exposition. In a second experiment, I used my ordinary pyro solution, 2 grains pyrogallic acid, 20 minims acetic acid, I ounce water, which I applied in the same manner as a preservative, but without any washing. The negative came out of the camera quite ready, nearly dense enough for direct printing; in order to make it a little blacker, I used a mixture of iron intensifying solution (with citric acid), and a drop of nitrate of silver. Tannin gave the same result. With an iron developer there was some veil, perhaps not enough citric acid having been employed. The negatives obtained in this manner are of a very fine character; they have the bloom so much liked, they are finely detailed, and very clear, resembling much the dry tannin plates developed with acid solutions. All these experiments have been made with a good bodied and alcoholic collodion (prepared in June), containing a large proportion of iodide and bromide, and with a new 40-grain nitrate bath, not acid. Two negatives I took with a thin (English) collodion which has been iodized five months ago. They had nothing of the bloom of the thicker collodion, although sufficiently out.

The development in the camera will, perhaps, give a means of ascertaining when the time of exposure is sufficient. An opening, fitted with yellow glass, might be made into the camera for looking in. If it be not possible to use this for portraits, it will, I think, do with reproductions, views, &c., so that it may save much pain and time to the operator. Solarisation is not possible when using this process, so that perhaps harmonious pictures will be obtained from much contrasted objects,—Yours truly, P. E. Liesegang.

Elberfeld, September 19th, 1864.

Photographic Notes and Queries.

Photography on Wheels.

Sir,—As "Photography on Wheels" is of sufficient importance to merit full discussion, and as the plans at present propounded seem to fall short of the required conveniences, perhaps you will allow me to add a few humble suggestions, arising out of some years' experience in out-door photography, I abandoned the one wheel and dark tent about three years since, for two wheels and no dark tent, the carriage itself fully answering this purpose. It is fitted up with yellow glass windows, zinc cistern and gutta-percha water-pipe. It has also a ventilator in the top, and bottles stand at the side near the top, to make as much clear room as possible. There is a shifting piece in the bottom of the carriage, which uncovers two openings for the operator to put his legs through, while he sits inside at his manipulations. The box in which the chemicals are packed becomes his footstool, to facilitate his getting in and out. As soon as the plate is dipped, he gets inside, and closes the doors behind him till the plate is ready to be exposed. The picture being taken, here turns to the carriage, and developes, &c. By this contrivance I can do work 10 × 8 and 12 × 10 plates, and as often as I have occasion I carry several cameras and lenses in it without inconvenience. As the carriage is placed on steel springs, and patent axles, nothing ever gets broken or misplaced, while the comfort of having a thoroughly steady and commodious dark house is no trifling consideration. As to appearances, you may make it as ornamental as you please. Mine looks exactly like a railway covered hand truck. The ⊣ handle with which it is propelled may be made to take out, and its place supplied with a pair of shafts for a pony when long distances with bad weather or sloppy roads require such a power, but a young man has driven my machine twelve or fourteen miles without being overdone. The top of the carriage for the space of about eighteen inches, opens and shuts like a box lid to facilitate the operator's ingress and egress. A very complete machine of this kind may be built for about £6 though mine has cost considerably more by altera-

tions made in it from time to time. I do not see any weight in the objection raised as to very bad roads. The remedy is to avoid them resolutely, or if upon some occasion which certainly must be very rare, you really cannot avoid them, go very gently, and this you ought to do, let the horse and carriage be what it may. A similar remedy applies to the very serious objection of fatiguing and sweating oneself for miles together in propelling the carriage, so as to be quite unfit to operate when the desired spot is arrived at. Never do it, but always get a man or pony, if needs be. The axletree should be short enough to pass the wheels through the usual hunting gates, but there should be a width to work in of about three feet, and the length should not be less than about five feet. The higher the roof is, the more agreeable it will be to operate in. Such a carriage must of necessity have a leg at each end, to prevent it upsetting with the wind and other causes, the front leg must be attached with a joint, so that it can be laid up while the trap is in motion.—I am, Sir, yours, obliged and respectfully, S. D.

Making Collodion.—Caramel Process.

Sir,—In making collodion, I carefully separate the prepared cotton with the point of a knife, and it facilitates its solution. Why should not a little machine, with two small four or six inch barrels covered with iron points, and so arranged as to pass the cotton through it, as in one of the processes to manufacture cotton, be made?

In the proposed "modification of the caramel process," I omitted, after pouring the caramel on and off the plate, to add the word "wash" before the words "and dry." I have no doubt that simple bromide of ammonium, say six or eight grains to the ounce of the preservative solution, would be found to succeed well, and also one-fourth of the quantities of iodide of ammonium and bromide of ammonium, which I have mentioned as added to the preservative solution (caramel). Some of your correspondents may at a future day suggest some correction, to make the process even more simple. At all events, it is very sure and certain. I find, with dilute albumen, that numerous small blisters, like specks, arise when the plate is washed after the application of the hyposulphate. It occurred on a plate which gave me a good negative this morning, but they were all reduced without injury to the view by at once drying it before the fire. I have had no such blisters with caramel, but caramel does not give the hard surface albumen does. T. F.

Rectifying the Nitrate Bath.

Sir,—It has been shown in a recent number of the News, that iodide of silver is more soluble in a cold solution of nitrate of silver, than in a warm one, and also that it is more soluble in a nitrate solution containing alcohol than in one without; now, it occurred to me that this principle may be taken advantage of in the rectification of the nitrate bath as follows. I placed a quart jug full of old bath solution (which had been set aside on account of pinholes) in the oven stirring occasionally to assist the evaporation of the alcohol, ether, &c., till it reached boiling point, when it became quite turbid looking, like dirty soapsuds. I then filtered it, a small quantity at a time, placing the filter in front of the fire so as to keep the solution *quite hot*, and the remainder of the solution, not in the filter, I kept in the oven till the other had passed through; the result was a beautifully clear solution on cooling, and one that gives satisfactory results, as I have taken negatives with it, both yesterday and to-day without any trace of pinholes whatever, and quite equal to those from a new bath.—I am, Sir, yours truly, Carbon.

Talk in the Studio.

The Centigrade Thermometer.—If the metrical system of weights and measures is introduced in this country, the adoption of the centigrade thermometer will doubtless constitute a portion of the reform. Indeed, independently of the metrical system, this instrument is gradually coming into use throughout the civilized world. It has already been generally adopted by men of science in all countries; and the time cannot be very far distant when it will be everywhere employed by the mass of the people. To grade a thermometer we want two natural standards of uniform temperature, and among the numerous standards furnished by nature, in the freezing and boiling points of various liquids and the melting points of different metals, the two best adapted to the purpose are the freezing and the boiling point of water. The centigrade thermometer makes the freezing point of water zero, and the boiling point 100 degrees above. Fahrenheit's thermometer is based on a series of errors and blunders. Gabriel D. Fahrenheit was an instrument-maker, of Amsterdam, who made some important improvements in thermometers about the year 1720. These improvements were suggested by Römer; and Fahrenheit has acquired universal fame by adopting them. The use of mercury as the liquid was a good thing; but the fixing of the zero point and the graduation of the scale were both absurd. The space between the freezing and boiling points was divided into 180 degrees, on what grounds nobody knows; and the zero was fixed at 32° below the freezing point, from the false notion that at that point there was entire absence of heat, or absolute cold. The centigrade thermometer was devised by Celsius, of Sweden, in 1742, and was introduced into France, along with the metrical system of weights and measures, at the time of the Revolution.—*Scientific American.*

How to Choose Eggs.—Those of your readers who are anxious to experiment with albumenized paper prepared with fresh eggs, will be interested in a mode of detecting them: in putting the hands round the egg, and presenting to the light the end which is not covered, it should be transparent. If you can detect some tiny spot, it is not newly laid, but may be very good for all ordinary uses except boiling soft. If you see a large spot near the shell, it is bad, and should not be used on any account. The white of a newly-laid egg boiled soft is like milk; that of an egg a day old is like rice boiled in milk; and that of an old egg compact, tough, and difficult to digest.

Photographs on Tombstones.—A custom proposed in one of the photographic journals some years ago, appears to have been adopted in Austria. It is stated that a custom now prevails of fixing on tombstones, in a glazed frame, a photographic likeness of the person lying beneath.

Negatives with Plain Collodion.—Last week we described a method of producing negatives without the aid of a nitrate of silver bath. We were informed a few days ago of a case in which it was alleged a negative was produced by means of plain collodion. A dealer being applied to for a bottle of the iodized collodion of a well-known maker, supplied what he believed to be the desired article. A day or two afterwards, it was brought back, with a statement that it was slow, and gave a thin feeble negative. On taking the bottle in his hand, the dealer was surprised to find that it was plain collodion, and then ascertained that it was really taken from the stock of plain collodion by mistake. It appeared, however, according to the evidence of the photographer, that it gave a thin blue transparent coating in the nitrate bath, and although slow, did give an image after exposure and development. There are two or three possible explanations, either the bath was so much saturated with iodide of silver, that the porous film, absorbing a portion, gave an image when exposed and developed; or the collodion containing some trace of nitro-glucose or other principle which formed an organic compound with the silver, which was sensitive; or that the bottle in which the plain collodion had been placed had possibly been used before, and retained some trace of iodized collodion.

Lord Brougham a Photographer.—A morning paper says:—Lord Brougham, who has just entered upon his 87th year, and is in excellent health, is entertaining a circle of friends at Brougham Hall, Penrith. His lordship is, among other things, an amateur in the interesting art of photography. Mr. Mayall, the eminent photographer, and his son, Mr. J. Mayall, jun., are included among the guests.

Stamps on Photographs.—The war tax on photographs, in the United States, has just come into operation, and is exciting some dissatisfaction from its injustice in detail. All photographs of every kind, except reproductions, have to bear a stamp, no matter how it may disfigure the picture. The amount is two cents for all pictures under a quarter of a dollar, three cents up to half a dollar, and five cents up to a dollar, with five cents more for every additional dollar and a fraction of a dollar. This is practically a tax of 5 per cent., or more, upon all photographs. Reproductions are not stamped, but charged 5 per cent. upon their price. The injustice of the

matter lies in the fact that the tax is levied upon the cost of the finished picture, frame and glass included, notwithstanding that the frame has already paid its specific tax before it comes into the photographer's hands, and that it is also levied on the colouring or painting of the photograph, notwithstanding that painting in itself is not taxed at all.

ENAMELLING PHOTOGRAPHS.—A correspondent, Mr. Walter Woodbury, of Manchester, informs us that he has practised enamelling photographs on the principle we described some time ago in the NEWS. He sends us an example of a very pretty modification of the effect produced by adding two or three drops of aniline magenta to each ounce of the collodion to be used in the enamelling. The result is not a definite and positive colour, but a warm delicate glow communicated to the whole picture.

EXHIBITION OF THE FINE AND INDUSTRIAL ARTS AT TUNBRIDGE WELLS.—An exhibition of works of fine and industrial art has been held during the last week, in connection with the Belgrave Mechanics' Institute, at Tunbridge Wells. We are glad to perceive from the catalogue, that photography was duly represented in the contributions.

To Correspondents.

F. C. T.—Transparencies for the magic lantern are, as a rule, better not varnished, as in the enlarged image the structure of the varnish is apt to become apparent. The only use of varnishing is to protect the film from injury. 2 You will find a short article in our present number giving suggestions for dealing with that class of collodion, which is apt to dissolve on the application of spirit varnish. 3. The risk which an unvarnished film is subject to arises—first, from the liability to scratches; and next, from the action of the atmosphere and the gases it contains, which sometimes injure the silver image.

A. B. C.—Wherever a gold toning bath is seen to change colour, becoming first pink and gradually purple, it indicates the commencement of a reduction of the gold, which, of course, impoverishes the bath. Excess of alkali, or standing in the light, tend to bring about this result. 2. The use of iron and silver for intensifying has the advantage of great convenience, inasmuch as the solution may always be kept ready for use; but either iron or pyrogallic acid will give good results, if properly used. 3. Calico is as good a material for blinds as anything.

C. F.—The spots in the excited paper and the unfixed prints, which you enclose, arise from air bubbles on the surface of the exciting bath, and these probably arise from the albumen being partially dissolved. You do not state the strength of your bath; but it is, probably, getting somewhat weak and dissolving the albumen. The spots in the fixed print are from a different cause, the nature of which we do not know, without further data. 2. Many photographers do succeed admirably with the nitrate of soda bath. 3. We believe the washing cradle answers very well, but we have no personal experience of it. We do not know the price.

T. E.—There is an improvement in your lighting; but it is still too directly from the front. If you had it more from one side, so as to secure a little shadow on the other, the pictures would have more relief. You can exchange pictures with the members of the Exchange Club, whose names we from time to time publish.

J. J. B.—The best material we know for tents is known as *twill*, it is free from dressing, and two or three thicknesses will make a tent impervious to light. It can be had both in black and yellow; the latter should be used for the lining, and the black for the cover.

K.—It is very difficult to utilize an aceto-nitrate bath for any other than its own purpose, because the acetic acid is injurious in most cases, and it is almost impossible to eliminate it from the bath. Your best plan will be to use it as a paper bath, either as it is, or after evaporating to make it a little stronger, and in order to neutralize the effect of the acetic acid, fume the paper, after it is excited, with ammonia. 2. The best mode to avoid the deposit on the shadows, whilst intensifying, will be to increase the amount of citric acid in the intensifier. 3. The most experienced operators in the collodio-albumen process state, that the character of the nitrate bath for the first treatment of the plates is of but little consequence. The bath in which the final sensitizing takes place should be acid with acetic acid. 3. Mr. Mudd is the best collodio-albumen photographer we know, and we prefer his method of working; but if you are more successful with any other modification, by all means stick to that which gives you the best result. 4. Two minutes' immersion of the collodio-albumen plate in the aceto-nitrate bath is more than enough. We believe Mr. Mudd does not leave the plate in the bath half that time.

W. B.—Your pictures are very clean and brilliant, and the printing is good. Your light, however, comes a little too directly from the front, so that you do not get the relief and modelling which your chemical condition would otherwise secure.

W. G.—In the answer to which you allude the trial was between 2 and 5, and in favour of the former. 2. There is no lens in existence, that we know of, which has a perfectly flat field. The most that can be done by opticians is to approximate in that direction. A good portrait lens of eight inches focus, at a distance of eighteen feet from the object, will probably give moderately good definition over a flat surface of about two inches; in order to extend that area a stop must be used. But, except in copying, portrait lenses are not required to define a flat surface, but objects in relief, and the capability to define a flat surface perfectly would be but a poor recommendation, in our estimation, in a lens for portraiture. A lens in the hands of a photographer is a tool for producing pictures, and that is the best tool which is best adapted for the work for which it is intended. Therefore, the test in question is not a good one for a portrait lens.

J. S.—If your bath, made with thirty grains of acetate of soda and one grain of chloride of gold, show a tendency to decompose, it is either because you keep it standing in the light, or because the acetate of soda is slightly alkaline. If the former, then make it a rule to keep it always in the dark; if the latter, take care to use a much smaller quantity; the exact proportion you must ascertain by experiment with the especial samples of chloride of gold and of acetate of soda you have in hand. 2. The only fault of the print you enclose is the stain of a bluish tone at the edge, and appears to arise from the paper being at the edge of a sheet to which the drainings have flowed in albumenizing the paper. It might have been made deeper in tone by longer immersion; but we prefer the warm tone it possesses. 3. Where, in discussions or formulæ referring to toning solutions, the term so many grains of *gold* is used, chloride of gold is generally meant. 4. If the hypo be fresh and neutral, too long immersion will simply reduce the depth of tone, and give the print a washed-out effect. If the hypo be old or acid, the whites of the print will turn slightly yellow, and the tone of the blacks will deepen. 5. In using a developing box in which you have to watch the development progress through yellow glass, the eye requires to get accustomed to the effect a little in order to judge rightly. 6. Common sugar may be used in the developer, but it is not so good for the purpose as sugar candy. 7. If a small stop were placed absolutely in contact with the anterior surface of the lens, it would produce a similar result to reducing the size of the lens; but the stop is not in contact with the lens, and consequently the whole of it is employed in producing the image. The picture is a very good one indeed, and the whole effect very pleasing. The distribution of difinition is excellent. If you find that a fixing bath with one part of the salt in five of water produces blisters, and reducing the proportion to one in seven is a remedy, by all means stick to the latter.

J. M. BURGESS.—Our first impression on examining the enlargement you forwarded was that it was developed. It appears, however, from your note that it is printed direct from a negative in a pressure frame. The reason of the faint sunken appearance is, doubtless, the absorptive character of the paper. Being of a soft spongy nature, and very thick, both salting solution and silver solution have sunk into the paper, instead of remaining chiefly upon the surface. Hence the want of vigour by reflected light, and the great force of the image when viewed by transmitted light. If the salting bath had a little gelatine or gum tragacanth added, and the paper had been floated instead of immersed, it is probable that you would have had a vigorous image on the surface, instead of within the texture of the paper; or the use of a paper of a harder, less absorptive, character would also have given you more vigour. The picture is one of the most charming we have seen for a long time, both in subject and treatment. A good print of it must be a very beautiful picture. By what method was the enlargement of the negative effected? 2. The Marseilles competition is doubtless open to English photographers. 3. Mr. Solomon is the agent for the lamp for burning magnesium wire, invented by Mr. Grant. We are glad to hear the success of the wax treatment. Thanks for the charming cards enclosed.

T. PRYCE.—Thanks for the interesting communication, which shall appear in our next.

Several articles and communications in type are compelled to stand over until our next.

Several Correspondents in our next.

Photographs Registered during the Past Week.

A. G. TOD, 2, North Parade, Cheltenham,
Photograph of Sir James Outram.

MR. JOSEPH PEEL, 6, Saville Row, Newcastle,
Photograph—Group of Ladies and Gentlemen in the Costume of the Times of George III.

MR. THOMAS WILLIAM ARTHUR, 34, English Street, Carlisle,
Photograph of Carlisle Cathedral.

MESSRS. CRAMB BROTHERS, 67, West Nile Street, Glasgow,
Photograph of Rev. Marcus Dods (Renfield Free Church, Glasgow).

MR. HENRY JOLLIFFE, Esplanade, Ryde, Isle of Wight,
Two Photographs of Sir Joseph Paxton.

MR. CHARLES SANDS, 13, St. James's Street, Brighton,
Two Photographs of Mr. James Taylor (the Champion Comic Singer of the World), in the characters of "Sarah Walker" and "Simple Simon."

MESSRS. HELSBY AND CO., 34, Church Street, Liverpool,
Photograph of Mr. Walter H. Searle.
Photograph of Miss Wallace, of the Strand Company.

MR. JOHN SENIOR, Harlow Heath, Harrogate, Yorkshire,
Drawing of Hot Water Apparatus for Vinery and Conservatory.

MR. AUBREY PAUL, 1, Thames Place, Putney, S.W.,
Photograph of Charles Richardson, Esq., LL.D. (Author of Richardson's Dictionary, &c. &c.).

MR. FRANK G. MORGAN, Petworth, Sussex,
Photograph of Dr. Arnold (Organist, New College, Oxford).

MESSRS. COGAN AND YORK, 38, Milsom Street, Bath,
Three Photographs of Dr. Colenso, Bishop of Natal.

MR. F. W. EVANS, 246, Old Kent Road, S.E.,
Photograph entitled, "We shall both be taken."

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to THOMAS PIPER, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 317.—*September* 30, 1864.

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EXPERIMENTS IN LIGHTING.

IT has often occurred to us when enquiries have reached us, such as are preferred from time to time, as to the best arrangement of blinds, or the most desirable mode of dealing with the light in given galleries, that experiments in lighting, for the purpose of examining different effects, are too little practised by photographers. It most frequently happens that the photographer has to build his glass room as circumstances will permit: the place on which it has to be erected, the surrounding objects, the amount of money to be expended, and a number of other circumstances, often govern the aspect, shape, size, and many other points in the character of the studio. These are circumstances beyond control, the result of which is an infinite variety in the style and capabilities of the various erects. One is chiefly dependent on top light, another on side light; one is all glass, whilst another can only have a limited amount of window space; one is lofty, another is low, whilst they front towards every point of the compass. It follows, as a matter of course, that no definite system of blinds can be applicable, without modification, to every case, and it behoves every photographer, therefore, to acquire by careful experiment, a complete knowledge of the capabilities of his own studio, and the exact result of every blind in governing the lighting of the model.

It is desirable in commencing such a series of experiments, to have some definite idea of the result to be produced, and of the mode of producing it. The photographer should commence with some knowledge of the laws which govern the action of light. He should know, for instance, something of the laws of reflection, seeing that it is by reflected light he really does the bulk of his work, for even were he working with direct sunlight, without reflection, he would be unable to produce anything having the character of a picture. It is to reflected light that everything like modelling, texture, or roundness is due. But for the property of light of being reflected, no object would be visible except when the direct rays of the sun fell upon it, and then only the side which was illuminated, which would appear as a very vivid silhouette, every other part being hid in the blackest of shadows. But as the clouds, and every object on the earth, and even the atmosphere itself, all reflect light, we have detail in the deepest shadows, and the appearance of relief and modelling everywhere.

There are two especial points which the photographer must study in relation to his own glass room: how to regulate the admission of the direct light, so that it shall properly reach his subject and nothing else, and how to control his reflections, so that they shall aid in producing a good result instead of spoiling his work. For it should be remembered as a golden maxim that every direct ray of light and every reflected light which does not aid in producing the image in the camera, is an intruder doing harm instead of good.

A very simple mode of commencing experiments for determining the value of direct light and reflection in giving modelling and relief, may be tried as follows:—Place a white bust in a dark room, and illuminate it by means of a candle. If the candle be held at one side of the head, and moderately close to it, that side will be well illuminated, and the contour well defined; but with the light falling direct upon the side in this way there will be but slight modelling or texture, even on the illuminated side, whilst the opposite side will be in total darkness. Now bring the light directly in front, at the same distance. The whole of the front of the face will be well illuminated, but will appear somewhat flat and wanting in texture and relief. Next place the candle so that the light falls partly in front and partly on one side, the light being raised a little higher than the head. Considerable relief will be produced, but there will be some very heavy black shadows on the opposite side of the face, especially where the nose quite interrupts the light. Now take a reflector and place near the shadowed side so as to throw some light into the shadows; or if a reflector be not at hand, take another candle with a smaller flame and place it at a proper distance from the shadowed side. The reflector lighting up the shadows will at once give relief, texture, and modelling to the whole head. The same effect will be produced by the second candle, provided it be properly managed. But if the second flame be too large, or be brought too close to the face, it will remove all shadow, and give a flat effect to the face; if, on the other hand, it be of the right size, or be placed at the right distance, the shadows will be sufficiently illuminated to give detail and transparency, and the whole effect will be that of relief and vigour, without blackness or hardness. Now try a profile view lighted from the front, it will be seen that the effect is feeble: next try the same view with the light a little behind, and it will be seen that a vigorous well defined profile is produced. Try also all the experiments with the candle moved to a moderately great distance from the model, the effect of relief will be softly but well marked, at, however, some expense of illumination. Many other experiments may be tried by the aid of the candles, into which it is unnecessary to enter here. Our aim is rather to point out a method whereby some well marked effects may be produced, as suggestive of more practical experiment in the studio.

Now take the white bust into the studio on a bright day, and proceed to try the effect of different arrangements of your blinds. If the room be lighted from one direction only, a reflecting screen will be required; if it have light on both sides, the reflections must be managed by the admission of a subdued light, at the side opposite to the principal light It will be well to begin with the full amount of light which the room will admit, and gradually close blind after blind, watching the effect carefully on the model. And we may here remark, that it is a most important education of the eye to accustom it to ascertain what is the effect of light and shadow on any object, by examining it direct, without needing to look into the camera to ascertain the effect on the ground glass; and until the photographer has attained this power, he has not mastered a most important part of his duty in the glass-room. As a general rule, it will be observed

that the most perfect effect of relief and modelling is obtained when the light is admitted in a comparatively small volume, and from a point at some distance from the model, a broad expanse of light falling on the model, tending to flatten it. The experiment may be made more complete by turning the model in different directions towards the light, so as to observe the best effect produced in this respect, as well as by alteration of the blinds. The effect on the white bust will be generally tolerably well marked, as there will be no colour to interfere with the simple effect of light and shade, and the photographer will be undisturbed in his observations by any difficulty in managing the sitter.

Another excellent mode of forming some idea of the lighting, is for the photographer to place himself in the place usually occupied by the sitter, and examine the light reaching him. He may safely come to the conclusion, that all the light which does not reach his eye is useless, and may with advantage be shut out of the room, excepting always that which may fall upon the lower portion of the figure, and may be required for its proper delineation. But that which falls on the ground in front of him, or on the walls or other objects in the room, is simply causing unnecessary and uncontrolled reflections, which may probably interfere with the proper delineation of the image. On the other hand, where sash-bars, curtains, &c., meet his eye in a direction from which light should reach him, these are injurious, and really retard his operations.

The number of experiments which may be tried in becoming familiar with effects in lighting are numerous and various. The effect of direct vertical light, and of every form of top light; the effect of direct side light, of direct front light, and of light somewhat from behind the figure, and of every combination of these, should be tried; but the great object is to familiarize the eye with the varied effects, as shown on the model itself, and to understand what will be the effect of these when translated into light and shade on a flat surface: and also to understand the exact effect of each arrangement of blinds in the special studio in which the work has to be done.

In making the experiments, let the student always remember that all direct light which does not reach the sitter, is not only useless, but may be injurious. That all reflected lights not under control are useless or injurious, and that as all objects reflect light more or less, all light which enters the studio and does not illuminate the sitter, will probably produce injurious reflections. And that a comparatively small volume of good light under proper control, and reaching the sitter from the right quarter, is necessary for producing rapidly a perfect and well modelled negative.

Since writing the above, we have had an interesting conversation with Mr. McLachlan regarding the subject of lighting. Leaving the value of his patent blinds and the validity of his patent to be determined by proper tests, we may remark that we find Mr. McLachlan an enthusiastic student of the principles upon which the studio should be lighted; and after expending much time and money on putting various theories to the trial, he has manifestly a shrewd and keen appreciation of the proper conditions of lighting; and we are happy to state that he has undertaken to place his views on the subject, the result of much study and experiment, before our readers in a short series of articles. Whether his blinds effect the purpose for which they are intended—of which we hope shortly to be able to speak more definitely from actual inspection and experiment,—and whether his patent claims be maintained or not, photographers must benefit by a full discussion of a very imperfectly understood subject.

NEW PERMANENT PRINTING PROCESS.

Our readers are familiar with the name of M. Wothly, of Aix la Chapelle, as that of a gentleman who has for some years past been engaged in experiments for the purpose of securing a method of permanent photographic printing; and they have doubtless seen the frequent recent allusions in the letters of our Paris correspondent to various charming specimens exhibited by M. Wothly in Paris, as illustrations of the progress of his experiments. He has now, we understand, completed his operations, and attained complete success. The process, which has been patented in this country, has been purchased by the United Photographic Association, who intend not only to work the process itself, but to enter into arrangements with photographers generally, professional and amateur, to permit the most extended production of permanent prints, and, we believe, on liberal terms.

The process appears to be as simple, certain, and beautiful in result as it is possible to conceive. We are not given to ecstatic rhapsodies in expressing our admiration; but we have no hesitation, whatever, in saying that we have never seen more beautiful photographs than those produced, not only by M. Wothly himself, but also by Col. Stuart Wortley, to whose courtesy we are indebted for an inspection of the process in all its details. We are not at liberty, at present, to state much more of the process than that it consists in the use of a salt of uranium, the image from which may be either kept in the brown tint produced by light, or it may be toned by any of the usual methods. We may, however, briefly describe the manipulations.

A piece of plain paper of any size is coated with collodion, by pouring it on in the usual manner, the paper being attached at the corner to a board. This collodion contains the salt of uranium in solution. The paper is hung up to dry in the dark, and then exposed under a negative in the usual manner. The exposure is somewhat shorter than in silver printing, and the result is a visible image of a brown tone in the shadows, and slightly yellow in the lights; the printing is to be carried to the depth required for the finished print, and no more. It is then removed, and placed in an acid solution, which removes the unaltered salt of uranium; this is effected in a few minutes, and is completed when no trace of yellow is seen in the whites. The print may now be rinsed, and the operation is completed. The print in this stage possesses a warm brown tone rather resembling the tint of bistre than sepia, and by many persons the tone so produced will be admired. If, however, a deeper tint be desired after rinsing, the print is placed in a toning bath: this, we understand, may be any of those usually employed with silver prints, containing a solution of gold; the toning commences at once, and is stopped when the required depth of purple, purple-brown, or black is attained. A few minutes' rinsing completes the operation, and the print is finished.

As will be seen, nothing can be simpler than the operations we have described, and we understand that the certainty is equal to the simplicity, failure being almost impossible. It will readily be imagined, also, from the character of the surface, that the image is exceedingly delicate, registering the finest gradations in the negative, and giving a fine enamel-like effect to the picture. The image, indeed, appears to be rather in the collodion film than in the paper, thus securing great brilliancy in combination with delicacy. As, moreover, the thickness of the collodion may be modified at will, any kind of texture or surface may be secured. A very thin collodion gives scarcely any glaze whatever, merely a fine ivory-like texture sufficient to render detail well; whilst a thick collodion gives a surface more like highly albumenized paper, but without its vulgar gloss. Where it is desired, the salts can be used without collodion, so as to obtain plain paper prints. All the specimens we have seen are very beautiful, both in tone, gradation, and vigour.

As to the question of permanency, we cannot of course speak personally at present. We understand that M. Wothly has put the prints to the severest test, which they have withstood without change. We shall recur to this part of the subject next week, when we shall have more to say.

Before concluding, we should add that we understand that the Association are making arrangements to circulate specimens of the process, that photographers may examine its results before giving it further attention. It is then their intention, we believe, to issue licenses, and also to supply the sensitive collodion which will keep indefinitely, or to supply paper which will keep sensitive for a few weeks.

DOUBLE PRINTING FOR PORTRAITS.

We have recently received from Mr. C. Twyman, of Ramsgate, an admirable specimen of portraiture, which illustrates very strikingly the value in portraiture, where the highest interest is desirable, of double printing. The portrait is that of Sir Moses Montefiore, who was unwilling to be taken otherwise than in his own home, and surrounded by the accessories of his usual sitting-room. Mr. Twyman has succeeded admirably in producing a fine likeness, and a satisfactory and artistic picture.

The venerable baronet is seated in an antique chair with a newspaper which has just dropped on his lap, whilst he contemplates an oil painting portrait of his late wife, which stands on an easel before him. The background and accessories consist of the interior of a room, with ground and roof and furniture, in which a grand organ is an important object. The figure and foreground accessories are produced on one negative, and the interior, &c., on another negative; the latter, whilst sufficiently made out, are kept quiet, distant, and unobtrusive; the figure being at the same time bold, vigorous, and round, possessing fine relief against the less pronounced background. The attitude and expression are easy and natural, and the composition altogether good. The picture is about fourteen inches square, with dome-shaped top, mounted on india-paper made expressly to suit the shape of the picture.

The double printing is here admirably managed, and an effect produced which it would have been utterly impossible to obtain in one negative. A very skilful use appears to have been made of a pencil of sunlight, in sunning down obtrusive lights, giving distance and atmosphere where they were required, and introducing shadows to complete the *chiaroscuro*. It appears to us, that this is a direction in which but little has been hitherto done, and that there is ample scope for some skilful photographers to make a speciality of "portraits at home," from which profit and credit may be derived. Each picture would of course require the exercise of considerable taste, judgment, and skill, and would command an equivalent ratio of remuneration. We commend the matter to the attention of the skilful.

We understand that this is the first photograph of Sir Moses Montefiore, and the only one he will sit for. He has been fortunate under such circumstances in securing a real work of art, as well as a good likeness.

ON PRINTING FROM SEVERAL NEGATIVES.*

BY H. P. ROBINSON.

The necessity for printing from several negatives in producing pictures by photography, arises from two or three causes, but is chiefly due to the limits which the present state of optical science prescribes to the power of a lens. If it were within the bounds of possibility to produce a lens which would define perfectly, say 100° on a flat plate of not less than thirty or forty inches long, and at the same time give a sufficient degree of definition to objects in various planes wide apart, from the foreground to the extreme distance, and with all this work sufficiently rapid to permit the delineation of large groups, without the probability of moving; the photographer and artist might have produced the greater number of the effects necessary for his compositions at one operation, without resorting to the more troublesome and tedious process of combination-printing. Such a system of printing is then not a matter of caprice or eccentric choice, but a necessity forced upon the photographer who desires to embody by his art certain conceptions of his mind, by the limited power of the instruments at his disposal. These being limited in their power, he must task his ingenuity to make good the shortcomings. Adopting the Spartan's advice, his sword being too short he adds a step to it. How far such attempts are legitimate, I will not now discuss. I believe all efforts to produce good results of every kind to be legitimate, and that failure does not prove the effort to be wrong so much as it proves the person making it to be weak. If the photographer succeed in producing good results, worthy of the name of pictures in its most comprehensive sense, his art is elevated, and its extensive powers verified; if he fail in doing so, he alone suffers the shame of incapacity and of incompetent ambition.

In undertaking to make a few observations on the methods I employ in printing several negatives in one picture, sometimes called "composition," but which, I think, might be more properly termed "combination printing," I do not intend to say anything about fine-art composition, which is a totally different thing. The subject of composition, properly so called, has been exhausted in the third and fourth volumes of the Photographic News, by Mr. Lake Price, to whose excellent articles I must refer my readers, if they have not already devoted a considerable time to the study of art, before they attempt to use any of the artifices, I suppose I must call them, I am about to describe. For photography, without some knowledge of the rules of art, is as mechanical and poor a thing as some of its friends (from whom save it!) have pronounced it to be.

A Natural Sky to Landscapes.—This is the most simple form of combination. It is now very generally practised, and is easy of accomplishment. The landscape negative must have a dense sky, or the sky might be painted out with black varnish. In this case it is better to apply the varnish to the back of the glass; by this means a softer edge is produced in printing than if painted on the face.

I may here remark, that in applying black varnish at the back of a negative, occasions will often be found where a softened or vignetted edge is required for joining, where a vignette glass or cotton wool cannot be applied; in such cases, the edge of the black varnish may be softened off, by dabbing slightly, before it is set, with the finger.

When an impression is taken, the sky, of course, will be plain white paper, a negative of clouds is then placed in the printing frame, and the landscape is laid down upon it, so arranged that the sky will print on to the white paper in its proper place: the landscape part of the picture is covered with a mask edged with cotton wool, and the frame is exposed to the light to print. The sky is vignetted to the landscape, and it will be found that the slight lapping over of the vignetted edge of the sky negative will not be noticed in the finished print. In the above, I feel that I have been writing about that which is known to nearly every photographer, but it will serve as an introduction to more difficult combinations.

Two Landscape Negatives and a Sky.—A year or two ago, the editor of one of the photographic journals attempted to prove, that if a photographer took any form of photographic picture, except panoramic views, he would have his labour only for his pains—they would not sell—and that all those who used the panoramic lens and camera would make fortunes. This, I fear, very few photographers believed, for I have not noticed that the world has since been over-run with the results of this ingenious invention, or that any of them have been shown in the exhibitions. However, there is no doubt that a long oblong is a more pleasing shape for a picture than a square, and if the subject suit, it will be found much easier and better to take two negatives on flat plates and print them together, than to use panoramic cameras and curved glasses. Both negatives must be taken before the tripod is moved, pointing to one-half of the scene first, and then turning the camera to the other part of the view, and taking the other negative. The two negatives should be obtained under exactly the same conditions of light, or they will not match; they should also be so taken that a margin of an inch and a half or two inches is allowed to overlap each other. In printing, vignette, with cotton wool or a straight-edged vignette glass, the edge of the left-hand

* The substance of this article appeared in our Year-Book of Photography for the current year. It is now completely revised, and partially re-written for our present publication.

negative on the side that is to join the other, taking care to cover up the part of the paper that will be required for the companion negative; when sufficiently printed, take the print out of the frame, and substitute the right-hand negative; lay down the print, so that it exactly falls on the corresponding parts of the first part printed (this will be found to be less difficult, after a little practice, than it appears), and expose to the light, vignetting the edge of this negative also, so that the vignetted part exactly falls on the softened edge of the impression already done. If great care be taken to print both plates exactly alike in depth, it will be impossible to discover the join in the finished print. If thought necessary, a sky might be added, as before directed, or it might be gradually shaded down, allowing the horizon to be lighter than the upper part of the sky.

A picture I exhibited in the last exhibition of the photographic Society, called "The Deer Park, Stoneleigh," is an example of this kind of combination; Mr. Annan, of Glasgow, also, had a very beautiful little picture. "Willows by the Water Courses," produced by similar means, in the same exhibition.

A Figure with Landscape Background.—The easiest kind of figure for a first attempt would be a three-quarter length, because you would then get rid of the foreground, and would only have to confine your attention to the upper part of the figure and the distance; pictures of this kind have a very pleasing effect. In the figure negative everything should be stopped out, with the exception of the figure, with black varnish, on the back of the glass, when practicable, but for delicate parts where the negatives must join very closely, the varnish should be applied on the front. An impression must now be taken. Cut out the figure, lay it down on the landscape negative in the position you wish it to occupy in the finished print. It is now ready for printing. It is usually most convenient to print the figure negative first; when this has been done the print must be laid down on the landscape negative, so that the figure exactly covers the place prepared for it by the cut-out mask. When printed, the impression is finished. If there be much sky it will be advisable to sun it down. White paper skies are neither natural nor pleasing. If a full-length figure be desired, it will be necessary to photograph the ground with the figure, as it is almost impossible to make the shadow of a figure match the ground on which it stands in any other way.

A Group.—In making a photograph of a large group, obtain as many figures as possible in each negative, and so contrive that the joints shall come in places where they will be least seen, if seen at all. In my first pictures, this, and the hardness of some of the lines caused by the junction of the negatives, was one of my greatest troubles, and it has cost me years of study and practice to overcome this difficulty—or, I ought rather to say, to approach a little nearer to the solution of the difficulty, for I know that perfection is a long way ahead. It will be found most convenient to make a pencil sketch of the composition before the photograph is commenced; indeed, I do not see how an elaborate combination can be wrought out without one. If you cannot sketch, the best and only advice I can give you is, do not attempt to use the camera for this kind of work until you can. The technical working out of a large group is exactly the same as for a single figure, it would, therefore, be only a waste of space to go into further particulars.

How to Print the Picture.—At first sight it will appear difficult to place the partly printed pictures in the proper place on the corresponding negative. There are many ways of doing this, either of which may be chosen to suit the subject; sometimes a needle may be run through some part of the print, the point being allowed to rest on the corresponding part of the second negative, the print will then fall in its place at that point; some other point has then to be found at a distance from the first; this may be done by turning up the paper to any known mark on the negative, and allowing the paper to fall on it; if the two separate points fall on the right place, all the others must be correct. Another way of joining the negatives is by placing a candle or lamp under the glass of the printing frame, and throwing a light through the negative and prepared paper, the join can then be seen and easily adjusted.

General Hints in Printing.—It will be apparent that where many negatives have to be printed on one piece of paper, a considerable time must elapse before the whole is completed; it is important, therefore, to secure the best results, to print only in good light; to secure as rapidly printing negatives as is consistent with satisfactory intensity, to use a moderately strong nitrate bath, because then the paper is more sensitive; and to keep the paper dry and free from violent changes of temperature, both to prevent discoloration, and to prevent shrinking and expansion, which makes joining more difficult. If the printing frame be not large enough, the paper may be rolled up over the back, but must be very carefully protected from light. It is desirable that if any of the negatives be printed in direct sunlight, the whole should be; and if any in diffused light, the whole in diffused light, or it will be difficult to secure harmony of tone and effect in the gold bath. Where the negatives are painted out at the back, diffused light printing gives the best joinings. Harmony may at times be secured, and a joining hid by judicious sunning down of the part when the print is removed from the pressure frame. A dark object may sometimes be printed with advantage over a light space without any stopping out. Take care to handle the paper no more than is necessary during the operation, and remember that spoiling the printing of one negative undoes the work of all the rest.

I hope I have kept strictly to the intention I formed when I commenced this article, and have confined myself to the paste and scissors part of my subject without interfering with those whose function it is to teach art in the abstract; but, before I conclude, I should like to say a word or two more on the legitimacy of this particular branch of photography, not that it requires defence so much now as it did a few years ago, for I am glad to see that many of those who laughed at my humble early efforts, have had sufficient candour to acknowledge that at least *some* effects might be attained by this method that cannot be attempted by any other.

My first plea is this. Many landscapes are undoubtedly improved by the judicious introduction of figures, it is also undoubtedly true that badly placed figures will mar the effect of the most beautiful landscapes, and that is why I say, have nothing to do with this kind of work before you have studied composition; walk before you run. Figures in photographic landscapes have hitherto been confined to a very small size, usually because it is not only impossible to get them and the distance into focus at once, but also because it is found to be impossible to get figures to remain still for a sufficient length of time, when long focus lenses with small stops are used. Combination printing removes this difficulty; the figures and the landscape being taken at different times, the greatest attention and the best photographic means can be brought to bear on each.

Second plea. If I have a negative with some good points in it, yet containing something very ugly that cannot be got rid of, why should I not use the good part in combination with parts of other negatives containing other beauties?

Third plea. It is often advisable, and as I have before said, often absolutely necessary, to take a group containing many figures on several planes. This has never been done yet at one operation, and even were opticians able to make a lens that would do it, it would not often be possible to get half a dozen people to remain sufficiently still long enough to allow an exposure of a few seconds. All photographers must have noticed that an otherwise perfect negative of a group is almost always spoilt by one of the subjects moving; by taking two or three at a time, and combining them, this great trouble is avoided. I might be told that

combination printing would be a still greater trouble; my answer is that a photographer is not worthy of his art who will not take all the trouble necessary to get the most perfect result.

ON THE PREPARATION OF DRY PIGMENTED GELATINE FOR MR. SWAN'S CARBON PROCESS.

Mr. Swan's new carbon process promises to place in our hands the long-wished-for desideratum, viz., a permanent printing process; it will be an especial boon to Indian photographers, as it will enable them to dispense with that "bug-bear," albumenized paper, which hardly ever reaches us in good order. I was much surprised in my first experiment to find that the preparation of gelatine and sugar would not keep for 48 hours without becoming decomposed, and full of small bubbles, the thermometer at the time being at 80° Fah. This proves that it would be useless attempting to keep the solution for several days in India, and I determined to try some plan for making a preparation of gelatine and sugar that should possess good keeping qualities, as, unless this could be done, it seemed that being obliged to prepare the solution fresh each day would be a great drawback to the process, and tend to prevent its general employment among professional photographers. The following, then, is the method of preparing a mixture of the pigmented gelatine and sugar, which will, I believe, keep as well as gelatine itself.

THE PREPARATION.

Place two parts of gelatine in a clean vessel, and pour sufficient cold water on it to cover it well; after half an hour or so, lift the gelatine out of the water, and observe if the latter looks muddy; if so, throw it away, and wash the gelatine in two or three changes to clean it thoroughly, then leave it to soak under water till wollen up and quite soft; it may now be lifted out of the water and placed in a porcelain evaporating dish, which should be set on a water-bath over a spirit lamp; the gelatine will soon melt, the operation being facilitated by stirring with a glass rod. While the gelatine is dissolving, take one part of sugar and dissolve it in a small quantity of water in another porcelain dish, place it over the spirit lamp for a few moments till the solution begins to boil; a perfectly clear syrup will thus be obtained. Next take the pigment which it is intended to use, and rub it up to a thin paste with a little water, with a pestle and mortar, or, better, on a ground glass slab, with a glass muller; place the paste and the syrup in a mortar, and mix them thoroughly, then add the gelatine solution, gradually stirring all the time, mix the ingredients well together till the mixture begins to cool, then turn the whole into a clean porcelain dish, and evaporate on the water bath, the mixture must be stirred all the time, if the colouring matter has any tendency to separate from the solution; continue the evaporation till the mixture gets very thick, then set it by to cool and solidify; when quite cool, and perfectly set, a knife may be run round the edge of the mass to separate it from the dish; if the evaporation has been carried sufficiently far, and the setting qualities of the gelatine have not been spoilt by allowing it to boil during the evaporation, the mass will be firm enough to be cut with a knife, and, although perfectly pliable, it should not stick to the fingers.

The next part of the process consists in drying the pigmented gelatine: to do this, cut the mass into thin slices with a knife, and spread on a sheet of paper before a fire or over a stove; when quite dry it should be put into a bottle and kept till required for use; in very damp weather, such as we are having out here now in the rainy season, the substance does not dry readily. The sugar, no doubt, tends to prevent it drying, and even after being dried, it will get soft again, if exposed to the air; not, however, necessarily to an injurious extent, as I have some which has been kept in paper for a week, and, though very soft, has not decomposed in the least. In making a solution of the above preparation for printing, it should be allowed to soak thoroughly in the water before heat is applied, or a perfect solution will not be obtained. The heating should be conducted on a water bath, as directed for the gelatine; when entirely dissolved it may be taken into the dark room, and have the solution of bichromate added to it. When it has cooled to the proper point, it will be ready for use, or it may be set aside for a few hours till required, and then heated, as directed by Mr. Swan. No exact directions can be given as to the amount of water to be added, as this will vary with the particular sample of gelatine employed; the best plan is always to use the same description, and a few trials will show the quantity of water required. I have not yet determined the amount of pigment which should be mixed with the gelatine, but as Mr. Swan has not been able to give the exact quantity himself, I hope the omission will be excused. The quantity of bichromate to be added will, I think, be obvious, as my preparation contains the same proportions of gelatine and sugar as the solution recommended by Mr. Swan—namely, two parts of the former to one of the latter.

PRECAUTIONS.

I have advised the employment of a water bath for heating the solution of gelatine, as this is the simplest contrivance for obtaining an equal and steady heat, and preventing the solution from boiling, which it must not be allowed to do, as boiling gelatine, or even keeping it a long time at a high temperature tends to prevent it solidifying on cooling. A water bath may be extemporized in many ways: a good plan is to place a porcelain evaporating basin on an iron tripod over a spirit lamp; put a porcelain filter ring in the bottom of the basin, and on the ring set another rather smaller basin, so that there shall be an inch all round for the hot water between the two basins; the gelatine is placed in the smaller basin, the ring keeps it off the bottom of the outer dish, and affords a steady support for it to rest on.

In making the pigmented gelatine, no more water should be added, either to the gelatine, to the sugar, or to the pigment, than is sufficient to ensure their thorough and complete admixture, as the more water is added the longer will be the time required to concentrate the solution. With proper care and cleanliness in the operations, I do not find that any filtering is required. The gelatine should be washed as directed, if not quite clean, and dust or dirt must be kept from falling into the solution during its preparation.

In drying the pigmented gelatine, the heat must not be excessive, or it will melt and stick to the paper on which it is placed to dry. It must also be sufficiently firm before drying, or it will not bear the amount of heat requisite for that operation without melting.

It may sometimes happens that the new substance will not dissolve entirely when making a solution for printing; the remedy will be to take more care in mixing the ingredients, and to allow the dried material to soften thoroughly in the water before applying heat; if this does not overcome the difficulty, the solution must be filtered. It is best done after the bichromate has been added, as the solution is then in its most fluid state.

Take a tuft of cottou wool and wet it with spirits of wine; wash out the spirit with water, as it coagulates gelatine; pull out the cotton and place it in a funnel, not too tightly, so that the preparation may run through easily; the operation must, of course, be conducted in yellow light, and the solution heated to about 140° Fah., that it may be as limpid as possible; in this way a beautifully clean solution will be obtained without difficulty.

In the above directions I have only given a method for preparing the substance on a small scale; for making it on a large scale, the plan adopted for concentrating and drying gelatine by the manufacturers of that substance, could, probably, be employed with advantage.

THE PIGMENTS.

In conclusion, a word about pigments may be useful to my photographic brethren out here. For black I use carbon collected from burning camphor, by holding a metal plate about half an inch above the flame. For red I used a filtered extract of stick lac, evaporated to a thick paste by heat; and for blue, I use indigo. All these things are procurable in the native bazaars, and are cheaper than they are in England. Various shades of purple and neutral tint may be obtained with them.

WM. L. NOVERRE, Assist. Consr. of Forests.

Raepore, Central India, August 12th.

ON THE SPONTANEOUS DECOMPOSITION OF PYROXYLINE.

BY M. DE LUCA.

UPON presenting to the *Academie* my first researches upon the products of the spontaneous decomposition of pyroxyline, on the 12th of August, 1861, I promised to continue them. I now submit to its judgment the results obtained in determining the several conditions under which the decomposition of pyroxyline is produced.

In the first place the condition of keeping the gun-cotton sheltered from the light, does not always furnish good results, particularly when the vessel which contains it is badly corked, and is surrounded with a moist atmosphere. Once the reaction has commenced with a slow disengagement of nitrous gas, it is not possible to stop it. This decomposition is greatly facilitated by the action of light, and still more by those of the direct rays of the sun or of artificial heat. A sample of gun-cotton was, after a commencement of spontaneous decomposition in the dark, divided into four portions, one of which was left in the dark, another was placed in the diffused light of a chemical laboratory, the third was exposed to the direct action of the sun's rays, and the fourth to the action of heat supplied by a *bain marie* marking 125° F. It was observed that while direct heat produced a vivid reaction upon the gun-cotton, direct light acted with less energy: that diffused light exercised a very slow action, and that in the dark, the gun-cotton was decomposed with extreme slowness. This spontaneous decomposition produced four very distinct phases: the gun-cotton, during the first phase of decomposition, slowly contracts without losing its primitive form, so as to occupy one-tenth of its original bulk. It remains in this state several days, and then it begins to dissolve, and is converted into a sort of gummy substance which strongly adheres to the fingers, and has lost its cottony texture: the bulk of it is also diminished one half: this state constitutes the second phase of spontaneous decomposition of gun-cotton. The third phase commences after a shorter or longer time, according to the temperature of the atmosphere; the phenomenon it produces is not a contraction but a dilatation, so that the cotton which has lost during the second phase nine-tenths of its primitive bulk, swells as much in the third phase, that it occupies the entire capacity of the vessel which contained it before its decomposition, that is to say, it has become nineteen times more bulky after its last contraction: in this state the gummy aspect continues to manifest itself, but the mass is porous and full of cavities, like a sponge. During these three phases, there is disengagement of nitrous fumes, which are abundant during the third phase; still, this gaseous disengagement diminishes in a sensible and progressive manner, and we then perceive that the matter loses its gummy aspect and yellow colour, becomes brittle, so much so, that it can be reduced to powder between the fingers, and assumes a white colour, like sugar. This state constitutes the fourth phase of cotton which decomposes spontaneously. The time necessary for the accomplishment of these four phases varies according to the temperature of the atmosphere, but it requires at least five months for their accomplishment.

Thus, gun-cotton, by the slow action of its own elements, and at the ordinary temperature, loses all its primitive properties in disengaging gaseous substances, in which we recognize the presence of nitrous compounds, and some traces of formic and acetic acid, and leaving for a last residue an amorphous porous matter, comparable in appearance to sugar, very acid, and almost wholly soluble in water, and containing abundance of glucose, which can be easily isolated, gummy matters, oxalic acid, a small quantity of formic acid, and an acid which I believe to be a new one, from which I have obtained a salt of lead, and which I shall examine hereafter,

The glucose resulting from the decomposition of pyroxyline has the taste and aroma of honey; it reduces tartrate of copper and potassa with great facility, and it ferments in contact with beer-yeast, with the production of carbonic acid, and alcohol. The quantity of glucose obtained from 100 grammes of gun-cotton spontaneously decomposed, was about 14 grammes.

Gun-cotton of good quality, exposed to the direct action of the light of the sun, soon exhibits signs of decomposition, at first by the odour of nitrous compounds, and afterwards by the yellowish colour of the vapours disengaged. All the specimens of pyroxyline that I experimented upon have become decomposed in a shorter or longer time, under the influence of the direct rays of the sun. Sometimes the change in the gun-cotton begins during the first day of the experiment; at other times the decomposition manifests itself after many days' exposure to solar light. In these experiments the thermometer stood at about 86° F., and the temperature seldom rose higher.

Artificial heat acts more energetically than solar light, but always at a temperature more elevated than that produced by the direct rays of the sun. A sample of gun-cotton was divided into two equal parts, one of which was exposed to the direct action of solar light, and the other in an oven to a temperature of 95° to 100° F.; the pyroxyline exposed to light decomposed first, the other portion was not altered by the action of 36 hours' artificial heat. There is then a peculiar action in the light of the sun which provokes the decomposition of pyroxyline.

When the gun-cotton is compressed, it is decomposed more readily, both by the action of solar light, and by the application of artificial heat. In the month of December, 1861, I introduced some pyroxyline into a test tube, and compressed it with a glass rod; I then made a vacuum, and closed the tube hermetically at the spirit lamp. The gun-cotton thus enclosed has been kept to the present time without showing any signs of decomposition; while similar samples, introduced into cork or ground glass stoppered bottles, or simply covered with paper, have all changed in a few months, that is to say, during the year 1862. It will then be important to verify these facts upon a large scale, and see if they will afford a ready application to the conservation of gun-cotton for the wants of industry.—*Comptes Rendus.*

ON THE APPLICATION OF PHOTOGRAPHY AND THE MAGIC LANTERN TO MICROSCOPIC AND NATURAL HISTORY CLASS DEMONSTRATIONS.

BY SAMUEL HIGHLEY, F.G.S., F.C.S.*

As I understand that Drs. Maddox, Abererombio, and Wright will read before this meeting papers on the production of photographs of microscopic objects, I beg to call attention to a special application of the very beautiful results obtained by the methods they severally recommend, namely, the projection of transparent positive photographs of such, or rather natural history objects on a screen, by means of an achromatic demonstrating lantern for the purpose of class instruction. I trust that I shall be able to show to those who may not have given previous attention to the subject, that the magic lantern

* Read in Section D, at the British Association.

is destinod to tako rank as a philosophical instrument of great educational value.

Most are awaro that natural designs have been produced by the ordinary magic lantern colourists; but such productions rarely satisfy us. Undoubtedly many subjects painted for the lantern are really artistic productions; but can the best artist pretend for one moment to copo with Naturo? Cau any artist, even if ho bo a pre-Raphaelite, for one moment hope to introduce the amount of detail she, with her undulating brushes of light, fixes upon tho film which her assistant, tho chemist, has prepared for her? For it must bo boruo in mind that whilst tho artist delights in broad effects, tho naturalist regards detail as a *sine qua non*, their aims being different; and it must be patent to every one, that while the painted views we have long been accustomed to meet every requirement where mere amusement is concerned, photographic transparencies on glass must be tho great moans whereby the magic lantern will be rendered subservient to the purposes of iustruction. I have long been impressed with tho conviction that tho lecturer on botany, zoology, mieroscopy, geology, anatomy, and even on pathology, would welcomo as a boon truthful trauscripts of naturo, which could bo packed in a small space, and then shown on a scalo to arrest attcution iu tho studeut. All persons who have had any experience in scieutific educational matters know the value of appeals to the eye. Book knowledge, or that experience gained from even the most graphic description, is of little value to tho student who would become a truo naturalist. Ho must see, if possible, handle, tho objects of his study. The next best thing to this is to be familiar with the most accurato dolineations of tho forms he wishes to become acquainted with; and here photography offers her aid, and the magic lautern popularises her efforts. Moreover, this modo of presenting delineations of objects described by a teacher is very impressive. The luminous diagram being of such a sizo that every student, in tho largest lecture hall, can discern the most minuto details, which is more thau can be said of ordinary diagrams as usually placed before a class. But beyond this, when tho photograph has been taken with due artistic regard to light and shade and angle of view, a perfect stereoscopic effect is produced, the object standing forth from the screen with all the roundness of nature. Again, as only one view is presented at a time, the attention of the student is fixed upon the subject of the lecturer's doscription, and the eyo cannot wander from ono picture to another, as is too often the case when a uumber of ordinary paper diagrams are displayed at one time. As ordinary magic lanteru pictures arc, in main, made up of patches of colour, they can be shown by lenses that do not require great optical perfection. As, however, photographs are mado up of detail if they are shown with lenses that are not achromatic, a fringe of colour is seen on every line, and this defect in the optical parts of the apparatus used in their exhibition will tend to produce a blurred effect, in fact, a picture wanting in definition. It is customary to mount each magic lantern view in a separato wooden frame; but if in place of this we produce our photographs within a disc three inches in diameter on glasses of a standard size, after the manner of the Microscopical Society, namely, 3½ inches square, then tho slides may be packed iu grooved boxes to occupy so little space that a professor might carry typical representations of any dopartment of naturo in his coat pocket. By this method it is only necessary to employ a pair of view holders, and to alternate them, ono subject being changed for the uext, whilst the previous one is being exhibited in the lantern. But photographic magic lantern views, even when uot in use, may bo made available for educational purposes: for I would suggest that if they represent natural history subjects, instead of stowing them away in boxes, they should be placed in the open cases of museums, &c., beside allied objects, care being taken that they aro fixed at such an anglo that light shall be reflected through them by means of a piece of white paper placed behiud the transparency, or by mounting the views in long frames backed with fino ground glass, they might serve as appropriate borders to the windows of a scieutific institution. The advantages I claim, then, for magic lautern views, when educational value is aimed at, are delineations truthful to nature, and abounding in detail, eheapness, compactness as compared with paper diagrams, and their utility in museums, when not in uso for their legitimate purpose. As the specimens placed upon the tablo have been exhibited upon the screen before the Society of Arts, the Photographic Society, the British Medical Association, &c., thero are mauy who can attest to their value.

Having referred to tho general advantages of the method advocated for the illustratiou of lectures, I will refer to one or two special subjects in detail.

Some ten years since I made an attempt at Bartholomew's Hospital to photograph anatomical subjects, which had been carefully prepared for me by Mr. Luther Holdens; but though from one to twenty miuutes' exposure was given, nothing but a faint image presented itself. I first attributed this extraordinary failure to the miasma of tho dissection room; but on the subject being photographed out in the open air, tho fine specimen now upon the table was obtained. Our failure was really attributable to the yellowish light reflected from the buff walls of the dissecting room; such yellowish light making little or uo impressiou upon a sensitivo photographie film, and this gives us a hint, if it bo thought desirable to employ photography systematically at our hospitals, the wall of the operating room must theu be left white or coloured blue; not that that colour will add any actinic power to the light reflected from such surfaco, for it is not an uncommon error amongst photographers to believe that, by allowing the light of heaven to pass through blue glass, increased actinic power is secured to their operating rooms. Though yellow glass will stop tho progress of the chemical rays, a bluo glass will add nothing to a passiug beam, whether it be rich or poor in actinie rays. The same, of course, applies to reflecting surfaces. Many are awaro that Dr. Hugh Diamond photographed a series of types of tho physiognomy of insauity, in many instances the progress of the various stages of rare cases, being periodically rendered by aid of the camera. There is no reason why this method should not be applied to pathological and surgical cases, for the portrait of a patient may be takén at any given moment, and instantaneously, when it would be an act of barbarity if tho hand draftsman and painter were called upou. Then for every negativo taken, any number of impressions either on paper or glass can bo produced either for use in tho stereoscope or on the screen. Thus many a raro case might be discoursed on by the professor or clinical demonstrator, not only at tho particular hospital at which tho patieut is located, but at any other medical school at home or abroad. Specimens of pathological photographs are placed upon the table.

Whenever it is possible, a negative should be taken froiu nature, but there are many cases where that is impossible, aud when a diagramatic treatment of the subject is desirable. This specially holds good of many forms of oceanic life; for, when out of a sufficient bulk of their nativo element, they collapse and look anything but from the life, aud the same modo of treatmeut applies to certain anatomical aud pathological subjects.

Again, from the rarity of tho subject desired, it may bo necessary to resort to engravings; but no expense should be spared to procure them from the works of the best authorities, and in such a style of execution as is to be found in the works of the Ray Society and tho Palcontographical Society. If artistic, the uegatives should bo taken from tho originals, so that the characteristic touch of the artist may be secured. Where negatives of microscopic objects have to be secured, we must adopt oue of several arrangemeuts which are founded on a common principle, such as have been recommended by Messrs. Reade, Delves, Shadbolt, myself, Drs. Maddox, Abercrombie, Wright, and others; but when professional engagements prevent the naturalist at other times than iu the evening, theu the magnesium light strongly recommends itself to uotice, and perhaps the best form of magnesium lamp is that in which a chargo of wire is burnt within the apex of tho flame of a Herapath blow-pipe placed within the focus of a small parabolie reflector.

In conclusion, I would say that every exploring expedition should be accompanied by its official photographer; that every national museum, observatory, and hospital should have its appointed photographic operator; and then the hoped-for time may come when we eau, iu a systematic manner, place the records of scioutifie travels, the transcripts of nature's treasures, and the history of the progress of disease upon the screens of our lecture theatres, amongst the stereographs of our cabinets, and in the pages of tho books iu our libraries.

British Association for the Advancement of Science.

CHEMICAL PHOTOMETER FOR METEOROLOGICAL OBSERVATION.

IN SECTION B, CHEMICAL SCIENCE.

Professor Roscoe explained the principles upon which the method of measuring the chemical action of light depended, and described the results which he had obtained in Manchester. By means of this instrument, it is easy to obtain the daily curve of chemical intensity of the sunlight at any spot, and the whole apparatus is of a very simple and compendious description. The principle will be found described in his lecture on light, which appeared in our last.

Dr. Sullivan recommended that the instrument which had just been described, should be introduced into observatories. He wished to know if this had been done.

Professor Roscoe said it had not, for the reason that he had only just completed his experiments. He should now endeavour to get it introduced into observatories. He had now made observations for a month, and had no doubt that the matter could be carried out.

Dr. Daubeny wished to ask Professor Roscoe a question respecting his recent lecture in the theatre. Some 34 years ago, he (Dr. Daubeny) made some experiments on the action of light upon plants, and he came to the conclusion that chemical rays had no action upon the decomposition of carbonic acid in plants, but it was done by the luminous rays. His opinion had since been confirmed by Professor Draper. He understood Professor Roscoe had come to an opposite conclusion, and he wished to know on what observations he had come to such a conclusion.

Professor Roscoe said he certainly did state and he must say that he believed at that moment, that it was the chemical rays which had the power of decomposing the carbonic acid. He said this with all respect to Dr. Daubeny and Professor Draper. He should be glad if Dr. Daubeny would relate his experiments, in which he proved it was not the chemical rays that decomposed the carbonic acid. He was about to say that he had not made any experiments upon the subject, but he believed it was generally admitted that chemical rays were those which decomposed carbonic acid.

Dr. Daubeny said he held a contrary opinion.

Professor Roscoe said he imagined the fact that blue rays were absorbed entirely by the green colouring matter of plants, proved what he advanced. They found that the green matter of plants would not allow those rays to pass, whereas, the parts which were colourless did allow them to pass. This was a proof that it was the really highly refrangible rays which decomposed the carbonic acid.

Professor Miller believed it had been shown that it was the luminous rays which effected the decomposition of carbonic acid.

Dr. Sullivan said there was a phenomena which preceded the green leaves—that of the conversion of the white compound which preceded the leaves. Would the spectrum deprived of chemical rays produce the green?

Dr. Daubeny said the direct conclusion he came to was, that luminous rays were those that were efficient; but as he used coloured glasses in his experiments, he wished to know if it had been established by other experiments that he and Professor Draper were in error.

Professor Williamson said they had a great number of rays, all of which acted, some on one compound, and some on other compounds. It did appear to him that the great direction of future investigation should be to determine what it was they were speaking of when they spoke of chemical rays. He thought it might turn out that many luminous rays did produce definite chemical action upon certain classes of bodies.

UNIFORMITY OF WEIGHTS AND MEASURES.

IN SECTION F, ECONOMIC SCIENCE AND STATISTICS.

Mr. James Heywood brought up the report on the best means of providing for a Uniformity of Weights and Measures, which recommended—1. That it is desirable, in the interests of science, to adopt a decimal system of weights and measures. 2. That, in furtherance of this proposal, it is desirable, from its scientific capabilities, to adopt the metric system. 3. That, as the weights and measures of this country are gradually undergoing a process of decimalization, it would be more advantageous, instead of drifting by degrees into a heterogeneous variety of systems, to change at once to a really convenient system. 4. That it be recommended to the Government, in all cases in which statistical documents issued by them relate to questions of international interest, to give the metric equivalents to English weights and measures. 5. That, in communications respecting weights and measures, presented to foreign countries which have adopted the metric system, equivalents in the metric system be given for the ordinary English expressions for length, capacity, bulk, and weight. 6. That it be recommended to the authors of scientific communications, in all cases where the expense of labour involved would not be too great, to give the metric equivalents of the weights and measures mentioned. 7. That the influence of the British Association would be beneficially exerted in obtaining from Paris an authorised set of metric weights and measures, to be placed in some public and frequented building in London. 8. That advantage will be derived from the recent publication of metric tables, by C. H. Dowling, C.E., in which British standard weights and measures are compared with those of the metric system. That treatises, explaining the metric system, with diagrams, should be forthwith laid before the public. That works on arithmetic should contain metric tables of weights and measures, with suitable exercises on those tables; and that inspectors of schools should examine candidates for pupil-teachers in the metric system. 9. On the subject of temperature, it is recommended that the authors of reports to be presented to the British Association, relative to temperature, be requested to give the degrees of heat and cold according to both the Centigrade and Fahrenheit's thermometers. 10. It is recommended that the scales of thermometers, constructed for scientific purposes, be divided both according to the Centigrade and Fahrenheit scales; and that barometric scales be divided into fractions of the metre, as well as those of the foot and inch. 11. That a committee on uniformity of weights and measures be reappointed. The report then referred to the history of the movement, and stated what was done with reference to the selection of a natural standard, and proceeds:—

The use of metric weights and measures has recently been legalized in Great Britain; and the Act on this subject has been passed in 1864, "for the promotion and extension of our internal, as well as our foreign trade, and for the advancement of science." Mr. William Ewart, M.P., has ably conducted this measure through the House of Commons; Earl Fortescue has had the successful charge of it in the House of Lords; and the Bill has been also supported by the International Decimal Association, in whose labours Mr. James Yates has taken an active and leading part. The investigations of the Committee of the House of Commons on Weights and Measures, in 1862, have assisted in forming an influential parliamentary party in its favour. Various recommendations were made, in 1862, by the House of Commons Committee, at the close of their report, among which were the following:—"That a Department of Weights and Measures be established in connection with the Board of Trade. The metric system should form one of the subjects of examination in the competitive examinations of the Civil Service. The gramme should be used as a weight for foreign letters and books at the Post Office. The Committee of Council on Education should require the metric system to be taught (as may easily be done, by means of tables and diagrams) in all schools receiving grants of public money. The committee further suggest that, in the public statistics of the country, quantities should be expressed in terms of the metric system, in juxtaposition with those of our own, as suggested by the International Statistical Congress."

Resolutions in favour of the recommendations were passed after some discussion.

BRITISH PHARMACEUTICAL CONFERENCE.

We subjoin one or two extracts interesting to photographers, from the proceedings of the British Pharmaceutical Conference held at Bath during the meetings of the British Association.

SALE OF POISON.

The report of a Committee on Accidental Poisonings, contains the following statements and suggestions:—

1. That there are seventeen out of the twenty-five cases in which there is every reason to believe that a thoroughly effective poison-bottle would have prevented the accident.

2. That there are at least three cases in which, had the poison sold been folded in black paper, and labelled properly, the accident would not have occurred.

3. That 80 per cent. of the usual cases of accidental poisoning may be prevented by the use of proper precautions.

4. That only one of the 25 cases was the direct result of ignorance.

The practical suggestions and recommendations made by the committee may be thus summarised:—

1. That to every one engaged in the practice of pharmacy, the facilities which exist for acquiring a theoretical as well as a practical knowledge of their business, rendering it incumbent upon them to do all in their power to make themselves thoroughly acquainted with their profession, in order to future safety and usefulness.

2. That a separate and suitable part of their shops or premises, set apart for dispensing prescriptions wherever this has not already been done.

3. That in the dispensing department there be a repositorium tonicorum, or poison cupboard, with lock and key, in which should be kept all the concentrated and virulent poisons; or a small bottle

of each sufficient for present use, the bottles being filled from store bottles, which should be kept in another and larger store cupboard or room, as required.

4. That the labels upon all shop and store bottles be in future so placed, that the whole of the label can be seen at a glance, on the plan introduced by Messrs. Ford and Shapland, of London, instead of writing round the bottles, as at present arranged.

5. That wherever practicable, every prescription be checked by a second person before it is sent out.

6. That liniments, lotions, and all poisonous liquids be dispensed in bottles registered by Mr. Merrikin, of Bath, and called "Merrikin's Caution Bottles," as being in the opinion of the committee superior to any other bottle hitherto used for the purpose, and that the labels be printed in red ink.

7. That the more concentrated and potent poisons, such as strychnine, morphia, prussic acid, &c., should not be sold in an unmixed state, without a medical order under any circumstances whatever.

8. That no poison be sold in a dangerous quantity by any assistant or apprentice without the express sanction of the principal.

9. That every poison, in addition to its name, be distinctly marked "Poison" before it is sent out, excepting medicine dispensing from a prescription where the statement of the dose or use of it may be considered sufficient.

10. That dry poisons, such as oxalic acid, sugar of lead, red and white precipitate, &c., be invariably folded in *black* paper, and in addition to the name of the article, that a label with the word "Poison" in bold white letters on a black ground be securely attached to each packet.

On the Purity of Foreign Iodide of Potassium.

BY F. C. CLAYTON.

The high price and large consumption of this article, has made it one which the manufacturer has special temptations to adulterate. Of late years, very large quantities of foreign make has found its way into our markets, giving rise to keen competition, which, in the case of drugs, is often far from improving their quality. From these considerations, we might still expect to find much that is impure, but the result detailed below lead us to a different conclusion. The impurities of iodide of potassium are bromide and chloride of potassium, and sulphate, iodate, and carbonate of potash. Moisture in excess is also to be considered an impurity, for besides giving the sample a greater liability to deliquesce, it shows an article of imperfect manufacture. The first-mentioned adulterant, though it has at times been frequently used, has in none of the 15 samples experimented upon been found, and the second only in quantities from 3·7 per cent. down to minute traces. Sulphate was never found in ponderable quantities, and iodate in only 3, all of which, however, were of foreign manufacture. Several English samples were analysed for the sake of comparison. In these three cases it never amounted to one per cent. Carbonate, though more generally present, never amounted to one per cent., generally much under this. From these results it will be seen, that the iodide of potassium now in the market is practically pure, the per-centage in all the samples being over ninety-five.

IMPROVED PROCESS OF PHOTOGRAPHIC ENGRAVING.

BY P. EMILE PLACET.

[The following is the specification of M. Placet for a new system of engraving, and in reference to which the author, as our readers will remember, made a charge of piracy against Mr. Swan some months ago. It will be seen that neither the purpose nor the details of the process justify such a charge. The process is, however, an interesting one.]

I spread on a clean glass a pretty thick coat of Judea bitumen, which, when desiccated, I expose under a stereo or other like plate (cliché) or surface carrying the design to be engraved, in a frame to the action of light. On being removed from the frame, the impressioned surface is covered with a coating of gelatine, and when dry, the whole is plunged in a mixture of naphtha and benzine. The liquid penetrating under the coating removes the soluble parts in contact with the glass, and soon the pellicle of gelatine becomes detached, taking with it the parts which remain insoluble. I transport the sheet of gelatine with the design or figure upwards to a flat surface of glass or metal. If the proof be examined, it will be found that the non-dissolving bitumen, which constitutes the design or figure, will appear in relief, which will be higher the more deeply the light has penetrated. The reliefs are similar to those produced upon a print by the lines in an engraved plate. Then to obtain a plate engraved in intaglio, it is accomplished by taking the mould of this surface in relief, and by having recourse to galvanoplasty or to the electrotype process, metal plates similar to the mould are obtained, which can be used as in copper-plate printing.

Instead of using Judea bitumen, as above described, similar results will be obtained by the employment of any vegetable or animal substance, which becomes insoluble under the action of luminous rays, such as resins, mixtures of bichromate of potass or other salts sensitive to light, and an organic matter, such as gum, dextrine, and albumen. And instead of gelatine as above described, any agglutinous body may be used, such as gum, collodion, caoutchouc, varnish, provided that this body shall have no action upon the sensitive coating and the solvent.

In order to give greater consisteney to the gelatine, a sheet of paper, thin textile fabric, a strip of wood, or thin sheet of porcelain, may be made to adhere to it before being dried. When a photographic design or picture (cliché) is used, the different tints will be represented by reliefs proportioned to their intensity, for the light solidifies the coating, so much the more deeply as it meets with less resistance in traversing the plate: therefore the plates obtained in such case are similar to plates engraved by aqua tinta. The necessary grain for inking the plates may be obtained by mixing with the sensitive substance a fine powder of some inert body, such as quartz. The mixture of bichromate of potass yields such high reliefs that I obtain plates engraved in such relief that they are fit for typographic printing. In fact the means described will afford, according to requirement, all kinds of engraved surfaces which may be required to take prints or impressions, or to decorate fancy articles, such as vases, cases, bijous, and the like.

And having now described the nature of my said invention, and in what manner the same is to be performed, I declare that I claim the improved process of engraving hereinbefore described.

Correspondence.

PHOTOGRAPHY IN GERMANY.

Sir,—A new photographic journal has just been founded in Germany, by the manufacturer of photographic apparatus and chemicals, Mr. Oscar Kramer, in Vienna. The editor is Mr. Schrank. The journal is illustrated with photographs, and is published monthly.

You have doubtless heard of the intention of Mr. Wothly, of Aix la Chapelle, to sell his invention, "Wothlytypie," to photographers generally for 200 francs. Now, Mr. Stuart Wortley and Warren Vernon have purchased the process of Mr. Wothly for England.*

Dr. Jacobsen, the eminent chemist, had nearly the aniline colours prepared for the purpose in photography to retouching the positive prints. The application of these colours is very easy, they hold on albumen without any preparation of the paper, and have a delicacy and brilliancy which I have never seen in the proofs retouched with other colours. Many photographers have employed with great success these aniline colours.

The Prussian Government is establishing a photographic laboratory on the Royal Polytechnic Institution here in Berlin, for the use of instructing the young engineers and chemists. Hermann Vogel.

Berlin, Sep. 24th, 1864.

THE FOTHERGILL PROCESS.

Sir,—As the suject of dry plate photography has lately received some attention in your columns, and it being one so particularly interesting to amateurs, I venture to send the following few remarks which may, perhaps, be useful to some of those who are seeking for a simple and certain dry process.

* M. Wothly offered the process for Prussia to 125 subscribers at 200 francs each, making a total of £1,000 for the rights in Prussia. The United Photographic Association have purchased the sole right for this country.—Editor.

After having tried the tannin, the Fothergill and its modifications, and some other dry processes, I have found none so certain, and to give such excellent results, as an ordinary Fothergill plate, coated with a 2-grain solution of gallic acid before drying, as suggested in one of your former YEAR-BOOKS. The plates are tolerably sensitive, and in my opinion give results superior to any others. In order to test the use of this wash of gallic acid, I prepared a plate in the usual manner, and allowed it to dry, and coated half of it with the 2-grain solution; I exposed it the next day, and on developing it, the half thus treated came out clear, intense, and brilliant, when only a faint image was perceptible on the others; a similar case will be found described on page 76 of Mr. Hughes's "Manual," 5th Edition.

I should be glad to know your opinion with regard to the keeping qualities of these plates.—I am, Sir, yours faithfully,

C. T. NEWBERY.

[We believe they keep well.—ED.]

THE PATENT BLINDS.

SIR,—I had determined to avoid all further paper controversy in reference to my patent blinds, but a letter which appeared in the "British Journal" of the 9th inst. is so exceedingly unjust to me, that I feel myself bound once more to claim my right of reply through your columns. Now, I have no objection to a fair discussion on the subject in question, provided the object in view be the elucidation of truth. But how can this be arrived at when, with one exception, those who attack me, prefer, like Iago, to stab in the dark?

I believe all just persons will agree with me when I assert, that in a discussion like this, affecting a man's character, and purposing to deal with facts, the names of the authors should appear. In dealing with matters of opinion a man has a perfect right to use a *nom de plume*, if he so please; but I respectfully submit, that a matter so personal, and depending entirely on facts, should be discussed openly and honestly. The editor of a public journal may keep back his authorship at pleasure, because he is, from the nature of his occupation, a person to be got at; but those moles who burrow in the earth, and only point out their presence by heaps of dirt, should, in my opinion, be discouraged by editors and reproved by readers.

As I expect this will be the last time I shall address your readers on the invention of my blinds, I must beg of you to allow me to recapitulate what has taken place, and I shall add some information with which your readers are not acquainted, and which will throw another light on the affair.

The day after Mr. Brothers paid me his royalty, I was waited upon by Mr. S. Cottam, who, after expressing great personal friendship towards me, said that he had a desire to see my blinds and system of lighting; and further, that he was in a position to do me great service in respect to them. Of course, as I did not suspect Mr. Cottam to be anything but an honourable man, I at once acceded to his request, and not only showed him my blinds, which he much praised, but very fully explained to him my system of lighting, and gave him my ideas on the subject generally. Your readers will, then, judge of my astonishment when, after hearing all I had to say upon the subject, he turned round and informed me that he was the "legal adviser" of Mr. Brothers, and that he had recommended him not to pay me any money on account of my patent. Next came Mr. Brothers's letter, which, together with my reply, I leave in the hands of your readers.

After this came a "correspondent" from "Lancester," with what he called, I suppose, a great stroke of wit. Then there was another correspondent from Ashton; and after him a re-appearance of the correspondent from "Lancester," who again after "Difficulty" once more appears for the purpose of attacking me through the subterfuge of describing Mr. Eastham's gallery.

Immediately on reading this last letter, I waited upon Mr. Eastham to inquire the meaning of it, and he not only repudiated the letter, but acknowledged that the whole arraugement he was working with had not been in use a fortnight, and that he derived great benefit from it. So satisfied was he with it, and feeling that he was indebted to me, that he *voluntarily insisted* upon taking a license. This he has done, and has paid me my royalty of £5

I have not mentioned, above, Mr. Gulliver's letter, which appeared some time since, and which was properly signed by him. Such communications are deserving of respect, but this is not the place for my reply. I may add that the "Lancester correspondent" favoured me with a private communication, enclosing a flash bank note from "Sympathy," I leave it for your readers to say who was degraded the most by this sorry joke.

Now, what is the whole of this correspondence worth? The main part of it is from the "Lancester correspondent," and how am I to know that the whole of it has not virtually sprang from from him? It may not be so, but I have every reason to believe that the entire thing has been worked in a circle. If I be wrong in that opinion, those who have not the courage to stand forward openly and fairly have no just cause for complaint.

I come now, Mr. Editor, to an announcement that may astonish some of your readers, and one which will, I think, throw a different complexion on a great part of the correspondence. I am enabled to announce the authorship of those letters which are dated from "Lancester." They have proceeded from no other than Mr. Samuel Cottam, of Brazennose Street, Manchester, previously alluded to, who called upon me with great expressions of friendship, and ended by announcing himself as Mr. Brothers's "legal adviser," he who sent me the flash note, who has written all that trash about brewers' ventilators, &c. &c., and whose last performance in his attack upon me, has foundered by the repudiation of Mr. Eastham himself.—I am, dear Sir, very truly yours, LACHLAN MCLACHLAN.

Manchester, Sep. 20th, 1864.

P.S.—This letter was sent for insertion in the *British Journal* on the 20th of September, but the Editors declined to publish it without consulting the proprietor. He now declines to publish it without suppressing the names, and obscuring the date, which places my letter in the same category as anonymous letters which furnish statements without proofs; now, as I have put forth no statement that I cannot legally prove. I claim its entire insertion as a matter of justice.

PINHOLES.

SIR,—I see many communications in the NEWS respecting spots and pinholes in the collodion film, and seemingly without much elucidating the cause. I have at rare intervals met with spots, as if the film were peppered over with fine coal dust. The same has occurred to me again this forenoon, hence this communication, whilst the subject is fresh before me. I have in every instance found them to proceed from the same cause, viz., reduction of temperature. I went this morning to take a view of a building, one-and-a-half miles distant, the temperature moderate, wind strong. The first plate was all covered as with a dark impalpable dust, but so fine as only to be detected by the practised eye. I at first blamed the developer (double sulph. iron and ammonia), as it was the sedimentary bottom of the bottle, with spirit just added, and when shaken up it appeared quite turbid. I gave it a rest to settle, then tried another plate, and found all to my satisfaction. On my way home I studied over what might be the cause. I had a nice warm place for my developing room, and considered that through increase of temperature my bath might have undergone a change betwixt dipping the first and second plates, and thus got into right working order again. When I came home I left the bottle of bath outside in a cold place, and at once filled my bath trough with another bath, which had not been out of the developing room, exposed a plate, shook up the sediment in the developer, and developed. No spots. Then poured out this bath, brought the other out of the cold, dipped a plate, exposed, developed with a pure developer from the stock bottle, the plate was covered with spots as in the morning, thus fully satisfying, or rather confirming, my previously formed opinion that this is the principal if not the sole cause of these black spots (dust excepted, and that is a very frequent cause, unless great care be used). Of course in winter the spots are much larger than I met with to-day, I have had them as large as a pin head. I have filtered and got a plate or two fair; filtered again, perhaps got another good; filtered again without any im-

provement. In such cases I *have found* a few weeks' rest the best cure, but should they occur again, the mode which I now adopt, that of diluting with water, or, in other words, washing out the excess of iodide of silver, filtering and strengthening, will be found the quickest and best remedy.

As to pinholes in the negatives in summer, I have little experience, as my developing room is not subject to great change of temperature, being a kind of cellar. I was a little troubled with them, and made up a new bath (the one I was using this morning) from a fresh sample of silver; instead of saturating it with iodide, I merely allowed a coated plate to remain in it a few hours; the first plate I tried was full of pinholes, and have got none with this bath free from them, whilst the old bath gives me little trouble. It cannot in this case be excess of iodide of silver that is the cause, unless it be contained along with the solid nitrate which I rather suspect, because in dissolving it does not all dissolve, but a flocculent matter arises from the bottom, and floats through the liquid, and after well shaking and dissolving the real nitrate, it settles as a sediment at the bottom. I have neither the time nor experience to test it, therefore I enclose you a small quantity for examination.

If there be anything new in these remarks, make use of them, as I feel very greatly indebted to your useful paper for the knowledge of photography which I have acquired.—I have the pleasure to remain, Sir, yours respectfully,

John McWhir.

Should I be making a new bath in winter, and have time, I will make the further experiments whether the cold has the same effect upon it, as on one containing excess of iodide of silver. I may also add that when I examined the bath with a powerful magnifier, I could see the liquid full of small needle-like crystals, imperceptible to the naked eye. In very cold weather the liquid has been full of them, quite large, and the dipper coated with them.

Wingate, Sept. 15th, 1864.

Photographic Notes and Queries.

Mr. Pouncy's Process.

Sir,—I see in your last week's Photographic News that Mr. Pouncy has made an improvement in the exposure of his process, but which improvement I claim, and think I am entitled to the credit of having discovered it; and which I wish your readers to be made acquainted with. You doubtless recollect my having explained to you, when in London, the way in which Mr. Pouncy's process could be made to work in half the time that he was at that time obliged to take to complete a picture; and on my return home, I called upon Mr. Pouncy, and asked him if he had found out any plan by which the exposure of his carbon prints could be diminished, and he informed me that he had not; and that, in fact, he had not studied it, but had given his mind to the keeping qualities only. I told him I had discovered a way in which I could develop it with less than one-half the usual exposure, and that would not, in any way, interfere with its keeping qualities.

Mr. Pouncy agreed to expose two pieces of his paper, one his usual time, and the other, half that time. The first he would develop himself, and the other I was to do; so that he might compare them; and when I took back the one that I had done, Mr. Pouncy said it was hardly deep enough, and that he had not had time to develop the other. I had two prints from him to develop, but could not get him, on either occasion, to produce the other prints to compare with those that I had done, and which I am sure you will agree with me was not a very fair way of doing business, and no doubt that his present improvement is a leaf from my book.

I am pleased to say that I have discovered another most simple carbon process, possible to be imagined; and the composition that I use has never before been used, and the keeping qualities would be as good as can be. I have not the means to carry it out as I should wish, but should be very glad to work it for any respectable person that would undertake the matter. I hope shortly to be able to send you a few specimen prints.—I am, Sir, your obedient servant, William Firling.

Grove Villas, Dorchester Buildings, 26th September, 1864.

Films Dissolving.

Sir,—Gum water *filtered* in the proportion of one drachm to ten ounces hot water, applied after the last washing of the plate, is an effectual remedy for the above. I always use Ponting's varnish.—Yours faithfully, W. H. Warner.

Ross, 25th September, 1864.

Preliminary Coating of Gelatine.

Sir,—I was led to suppose that the difficulty complained of by A. A. was caused by greasy glass, from his comparing the appearance to that of a greasy dish repelling water. From his last letter, I think that the cause is too much alcohol or acetic acid in the gelatine, perhaps both. In my last published formula, I advised the use of very little acetic acid, and no alcohol. When much acetic acid is used, especially if the glass is warmed, the liquid is very limpid, and appears to be repelled from the edges, but in reality dries very quickly in a thin layer, and is likely to form thick ridges. The solution should only be just thin enough to blow well, and be allowed to dry spontaneously.—Yours faithfully, C. Russell.

Stubbers, 28th Sep. 1864.

The Cornwall Polytechnic Exhibition.

Sir,—In your able report of the photographic department of our recent exhibition, I find that the productions of Mr. Barnett are the only ones which appear to meet with your disapproval. I hope you will allow me to express my regret that they should have been thus singled out, I venture to think—somewhat undeservedly. As I know it is the wish of the society to encourage local talent, and as, in the opinion of many, Mr. Barnett's collection of Cornish coast scenes, &c., were considered highly interesting, I think it but due to this painstaking and industrious photographer to ask you to insert this letter.—I am, Sir, your obedient servant, Sydney Hodges, Secretary.

Falmouth, September 28th, 1864.

[We have pleasure in allowing Mr. Hodges to bear testimony to the painstaking and industrious character of Mr. Barnett; but he must bear in mind that our correspondent—a gentleman thoroughly capable of discriminating photographic merit, and altogether above the indulgence of personal feeling—is under the necessity, in furnishing his report, of acting as an impartial Critic; and in this character he must judge of results rather than intentions. We have not seen the productions in question ourselves, but we well know the unpleasant character of the duty which compels the occasional expression of an adverse opinion, knowing that it must give pain. Our correspondent's adverse opinion of the productions of Mr. Barnett certainly appeared to be unwillingly expressed, rather than with any approach to *malus animus*.—Ed.]

Talk in the Studio.

Scenes in Wensleydale and Yorkshire.—We have received from Messrs. Jackson Brothers, of Oldham, some further examples of their charming landscape photography, the scenes of which are chiefly in Wensleydale, with some in Yorkshire, such as a fine series of Fountains Abbey. We have before had occasion to point out the peculiar excellence of the pictures of these gentlemen, as consisting in the artistic feeling which characterizes them; well chosen points of view and good photography do much, and the skilful placing of figures in each view do more, to make these photographs really fine pictures, which we can cordially commend. Next to their excellence, the most notable point in these pictures is their exceedingly low price, which is the lowest we have ever known for real excellence. The whole-plate prints are sold, well mounted, at two shillings each, a price much less than they are worth.

New Application of Photography:—We have just seen some results of a very ingenious and pleasing application of photography, invented by Mr. Walter Woodbury, whose contributions to our pages on photography in Java will be remembered by many of our readers. It consists in utilizing the action of light on gelatine and a bichromate, in a manner similar to that adopted some time ago in block printing, but for a fresh purpose. Gelatine rendered sensitive being exposed under a negative, is afterwards placed in cold water; the parts

not acted upon by light swell, whilst the others retain their original bulk. An electrotypo is now taken, and thus becomes the *cliche*, from which to mould transparencies in china, like those German productions which our readers have seen attached to windows, in which the picture is produced by gradations of thickness, producing various degrees of transparency or semi-opacity. The effect is very pretty and effective, and altogether novel in photography. The process, which admits of some other valuable modifications, is patented.

To Correspondents.

J. B. L.—Prints will frequently tone more rapidly when placed in a gold solution, without previous washing; but such a plan is very wasteful, sacrificing both the free nitrate in the print, which might be washed out and thrown down as a chloride, and also rapidly decomposing the toning bath, and destroying its toning powers before the gold is quite exhausted.

F. L. H.—Your collodion appears to be of that quality which gives a film soluble in strong alcohol, and hence the partial destruction of the image, and loss of detail on varnishing. Probably the use of less heat when varnishing will prevent this occurring. See an article on this subject in our last. 2. The yellow stains in the second print are caused by hypo coming into contact with the print before it is fixed.

E. GOODFELLOW.—Both 1 and 2 are probably very similar in rapidity, but No. 1 has, we think, the flattest field; whilst, if there be any difference in rapidity, it is probable that it is in favour of No. 2.

YOUNG ARTIST.—The highest glaze which can be communicated to stereoscopic slides is effected by the method we recently described as enamelling. When the slides are coloured, it is necessary to apply them to the gelatine whilst it is still quite tacky, without wetting the slide, as wetting would move the colour; and in doing this it is very difficult to avoid the formation of minute air bubbles. If the colour be mixed with "Newman's preparation," the coloured print may be wet without danger of removing the colour. Other methods of glazing consist in varnishing. If the print be applied to the gelatine without wetting, and many air bubbles be present, damping the back, or laying a piece of wet blotting-paper on the back of the print, and when the moisture has thoroughly penetrated, rubbing the print well down, will generally remove the bubbles without affecting the colour or making it run.

TYRO.—There is no form of artificial light suitable for taking portraits which is as cheap and innocuous as you desire. Magnesium wire is the only artificial source of vivid actinic light which yields no noxious fumes. The quantity to be employed in producing a portrait cannot be measured by lengths, as it depends on the thickness of the wire what quantity, as contained in a given length. From 12 to 20 grains are generally required for a portrait, the cost of which would be from about 7d. to 10d., when bought by the ounce. 2. The black powder thrown down from your old toning bath by the addition of protosulphate of iron is metallic gold mixed with a little iron and silver. Wash it with dilute sulphuric acid, and then well rinse: this will remove the iron. Then treat with aqua regia, which will dissolve the gold, and produce chloride of gold. The insoluble matter which will remain will be silver, which can be mixed with the chloride of silver and reduced. 3. The fused nitrate of silver may be used for printing, without disadvantage: the argentometer will indicate the strength of the solution as correctly as if crystallized nitrate were used. 4. It is of vital importance to your health to introduce some means of ventilation into your dark room. 5. Treat the silver stains first with tincture of iodine, and then with hypo or cyanide. This will remove the stain. The early volumes of the NEWS are out of print; some of the numbers are, however, still to be had.

W. J. states, that in enamelling photographs according to the instructions of Mr. Tunny, which recently appeared in our pages, all went well until he attempted to remove the print, with its enamel coating, from the glass, and this he was unable to effect satisfactorily. This might proceed from two causes: the plate might not be perfectly clean, or an unsuitable sample of collodion had been used. The tough, horny samples answer best. To make assurance doubly sure, however, it may be as well to give the plate the preliminary coating of wax dissolved in ether, described in Mr. Wenderoth's system of transferring, which appeared in our pages a few weeks ago.

W. R. P. J.—The refusal of pictures to tone most commonly arises from the fault of the toning bath, which has become inert; but it may sometimes arise from the paper having been kept long after sensitizing before toning, especially if the bath have been somewhat acid. Sometimes the addition of a few drops of a fresh solution of chloride of gold to the toning solution will commence the action, and cause it to go on satisfactorily; but there is no certain remedy for this state of things. In the case in question, the print would have toned more rapidly, in all probability, if it had been deeper printed.

AN AMATEUR SUBSCRIBER.—The stains on your prints arise from imperfect fixation. Your hypo is either old or weak, or exhausted, or the prints have not been properly immersed. The prints have the appearance of having been fixed in old exhausted acid hypo bath; or, if in a new one, the hypo is either bad or you have made it too weak, and not taken care that the prints were well immersed in the solution without sticking together.

AN IGNORANT PHOTOGRAPHER.—We do not know on what grounds the copyright of the picture in question is claimed. The mere fact of having taken a portrait of a customer, without some further arrangement, does not confer a copyright; but there are various modes in which a copyright might be acquired in the portrait in question, upon the legitimacy of which we can offer no opinion until we know the nature and ground of the claims.

GEO. CRISPARN.—Sometimes stains and spots will appear in a negative during intensifying, from imperfect previous washing, sometimes from the use of too much free nitrate, and from various other causes. 2. Re-crystallized nitrate of silver is generally best for the nitrate bath. The treble crystallized is not necessary, and the singly crystallized, or commonest sample, sometimes contains excess of nitric acid.

W. W. S.—Add a few drops of a solution of carbonate of soda, or of cyanide of potassium, until a slight turbidity is caused, then sun and filter.

C. O. P.—Uneven drying of tannin plates generally arises from some change of temperature during the process. Sometimes, when a plate is partially dry, the opening of the door in the dark-room, by causing a draught, interrupts the uniformity of drying. We believe that if a perfectly uniform temperature were preserved, the drying would be quite even. 2. It is probable that you use the carbonate of ammonia solution, or the pyro with it too strong, or both, possibly. This would cause the effect you describe. Or, possibly, your bath is not quite sufficiently acid. 3. Dr. Hill Norris's ordinary plates are prepared with gelatine, which is used in a manner very similar to the tannin solution. His extra-rapid plates are by a secret process. 4. For the purposes to which you refer, it is probable that a triple lens would suit you better than the single lens; but if you prefer the latter, one of either of the good English makers will answer.

T. REVON.—It is quite possible to enlarge negatives, 8 inches by 4½ inches, three or four diameters, or even more, without serious loss of definition, and obtain good results, if the original negatives are very good. It is necessary to have a dark box or camera; into one end the negative may be placed, and within the other end the lens of the camera with which the enlargement is to be effected. A good transparency is first obtained, and from that an enlarged negative. The process is more fully described in our YEAR-BOOK. This method is preferable for the amateur to the solar camera, as it is less cumbersome and expensive. Bear in mind that a very sharp and perfect negative, full of detail, is important to good results.

LIEUT. NOYEARE.—We should imagine that the best mode of sending prints for exhibition would be rolled up, unmounted, entrusting some one here to get them mounted and framed. We will look for the prints which you state were engraved. Thanks for present and promised communications We shall be glad to see the prints.

A CORNISH BOY.—It is quite possible that your distilled water was not quite pure; many samples are contaminated with organic matter, and occasion fog. We fear that you have not tried Mr. Gage's method with care and appreciation of the various reactions, and the results to be obtained from them. In your next operation you commit an error at the outset: having dissolved your metallic silver in nitric acid, the next step should have been to get rid of the excess of acid by evaporation at gentle heat, until the nitrate crystallized. This should then be dissolved in water, and again evaporated and crystallized: by this means the free acid would eventually be got rid of. But your plan of adding carbonate of soda to the extent of 2 lbs. is altogether an error, inasmuch as you are forming a large amount of nitrate of soda by the decomposition which ensues. The nitric acid having a greater affinity for the soda than the carbonic acid, the latter is liberated, whilst the others combine, forming nitrate of soda, the presence of which altogether prevents testing by the hydrometer. Besides, it is tolerably certain that you added a considerable excess of carbonate of soda, for the presence of carbonic acid would for a time cause the solution to give an acid reaction to test paper, long after the nitric acid was neutralized. Adding acetic acid would then form acetate of silver—a ready cause of the solution and paper rapidly discolouring. With the portion you have put through so many operations, you can do nothing better than throw it down again as silver. The quantity which has not undergone all this treatment will not remove the albumen if it have a very slightly acid reaction, unless it be very weak indeed. Test it, and ascertain its condition and its strength. If it be anything like 40 grains to the ounce, and have a slightly acid reaction, it will not remove the albumen.

A. GARNET.—The chloride of lime to be used in the toning bath is the common bleaching powder of the oil shops. It is best kept in a stoppered bottle. It will often happen that three grains of chloride of lime are more than necessary for one grain of chloride of gold, and the prints would be bleached and mealy with such a proportion; half the quantity will generally be sufficient. The bath will keep for weeks, and improve rather than deteriorate. A bath which bleaches excessively at first will often work well after keeping a few weeks, but we prefer to use a little at a time, and either throw it away when done, or if not quite exhausted, filter and add a little more from the stock when it is required for use next time. It is not imperative to wash away the whole of the free nitrate; sometimes the prints tone better if only slightly washed, but in such case the bath is generally of no further use when the prints are toned, as any free nitrate sets up a decomposition in the solution which renders it useless after toning the batch first immersed. Distilled water is not imperative, but it is often better than many samples of common water,

A number of articles and communications in print, together with the report of the North London meeting, are compelled to stand over.

Several correspondents in our next.

Articles on "Lighting the Sitter," by Valentine Blanchard, on "Photography in India," on "Waxing Photographs," and several other communications in type, are compelled to stand over until next week.

Photographs Registered during the Past Week.

MR. JOHN JAMBLIN, Penmaenmawr,
Four Photographs of the Rt. Hon. W. E. Gladstone, Chancellor of the Exchequer.
One Photograph of the Hon. Robert Curzon.

MR. W. T. DEANE, 7, Upper Hill Street, Richmond,
Two Photographs of H.R.H. the Duc d'Aumale.
One Photograph of the Duc de Guise.
One Photograph of H.R.H. the Duchesse d'Aumale, in Carriage.
One Photograph of Coach, driven by Duc d'Aumale, containing Duchesse d'Aumale, Count de Paris, Duc de Guise, Coutesse de Paris, Prince de Conde.

MR. J. H. KAY, 57, Argyle Street, Glasgow,
Two Photographs of the Rev. Dr. Jamieson, St. Paul's Church, Glasgow.

MR. GEORGE BRYANT, 12, Hanover Street, Portsea,
Photograph (from oil painting) "The Town Crier."

MESSRS. HELSBY AND CO., 34, Church Street, Liverpool,
Photograph of Mr. H. N. Warner, "The Great Australian Tragedian."
Photograph of Mr. H. N. Warner, as Hamlet.

MR. JOHN STUART, 120, Buchanan Street, Glasgow,
Photograph of the Rev. Fergus Ferguson.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 318.—*October* 7, 1864.

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DIAMOND CAMEO PHOTOGRAPHS.

We have another novelty to bring under the attention of our readers, which will at once arrest the attention of portraitists. We have frequently heard the opinion expressed of late, that the "carteomania" was on the wane, that everybody had obtained his card picture, that the albums were full, and the public beginning to be sated. No doubt this is, in some quarters, to some extent true. The question has been asked, What will be the next fashion? In answer to this question, solar camera pictures, or other enlargements, have been doubtfully mentioned. These, it is very probable, will come into increased demand: but the demand can never become a rage at all similar to that which has existed during the last few years for card pictures. The price and size at once preclude the possibility. To take the place of cards for which the demand begins to flag, the picture must be as cheap, as easily exchanged and preserved, and at least as pretty. The novelty we have to announce, more than fulfils these conditions.

The "Diamond Cameo Portrait," introduced by Mr. F. R. Window—whose interesting communications to these pages are familiar to our readers—or more properly by the firm of Window and Bridge, will, we think, give a new impetus to photographic portraiture. The size is the same as that of the card picture, the cost of production is no greater, whilst in beauty, likeness, variety of interest, and force of effect, it is superior to most phases of portraiture. The picture, as issued by Messrs. Window & Bridge, is the size of an ordinary card, and contains four portraits, each giving a different view of the face. Each portrait consists of a bust about an inch long, and three-quarters of an inch wide: two are side by side in the middle of the card, and two at the top and bottom, arranged in this order $\begin{smallmatrix} & 0 & \\ 0 & & 0 \\ & 0 & \end{smallmatrix}$. The top and bottom generally consist of a front face view and a three-quarter face view; whilst the others consist either of two entire profiles, one of the left and one of the right side of the face, or of a profile of one side, and a five-eighths view of the other; but of course, much variety in this respect is possible. But the especial peculiarity, and that which gives the cameo effect of the picture, is yet to be described: the oval containing each bust is punched into relief, so as to have a convex surface. The effect of this in giving the illusion of roundness and relief to the whole image, cannot be readily imagined by a person who has not seen it. It is difficult at first glance to believe that the features have not a special relief of their own, and the cameo effect is perfect.

Such a style of portraiture has many real charms and point of interest, besides that of novelty. Almost all the artistic difficulties which beset the photographer are got rid of. The graceful arrangement of hands and legs, and their delineation in anything like true proportion and in good definition, cease to distract the mind. Each small head is taken with the centre of the lens, and is unexceptionable in definition; and as the full aperture of the lens may be used without hesitation, the exposure is so rapid that there is no difficulty in obtaining good expressions, an end which is further aided by the entire absence of all torture in the way of arranging awkward limbs, a process so frequently fatal to a pleasant or natural expression in the face. As to the question of likeness and verisimilitude, the interest of this style of picture must at once commend itself to every one. There are few people who have not two or more aspects of the face with greater or less degree of dissimilarity, and it not unfrequently happens that the view which is most pleasing as a picture, is least striking as a likeness. The photographer in producing the picture, is thus placed between the horns of a dilemma; if he produce the pleasing picture, candid critics remark, "Very pretty, but certainly not strikingly like;" or, if he secure the striking portrait, the equally candid opinon is, "Very like, but certainly not flattering." In this phase of portraiture, there are four aspects, all under the eye at once. The mind rapidly and unconsciously combines these, and perceives the complete embodiment of the original in its natural aspect; a general rather than a specific likeness, a complete rather than a partial portrait. There is, moreover, in such pictures an entire absence of all vulgarity, the effect being quiet, classical, and artistic.

We have not space now to enter into a detailed description of the mechanical arrangement employed in getting the best result with the least trouble. A very ingeniously contrived dark slide has very simple movements for obtaining the four portraits in their due positions, and of the right size on the plate. When printed and mounted, the convexity of each disc is produced by means of a steel punch and an arming press, which is worked very quickly. The exquisite surface given by the face of the die to the picture, far exceeds that produced by rolling.

The general effect is that of four cameos or enamels dropped on to the card. We understand that the demand for them since their introduction has been very rapid, and they have elicited high encomiums from the highest personage in the realm.

The Diamond Cameo form of portrait is, we understand, registered. Information as to commercial arrangements will be found in our business columns.

THE NEW PERMANENT PRINTING PROCESS.

Several letters have reached us regarding the new permanent printing process, to which we referred last week. We can better consider these in a few general remarks, than in specific answers to each, involving repetition. The questions resolve themselves into the following:—

1. What are the especial advantages of the process over silver printing and over carbon printing?
2. What are the materials used, and upon what principle is the process based?
3. Is the process cheaper than silver printing?
4. Are the prints absolutely permanent, and how is their permanency ascertained?
5. Is it a new process or a modification, and when and by whom was the process discovered?
6. Is the patent valid?

We will endeavour to answer these points, embodied in the various letters, briefly and seriatim: premising, however, that as the matter is at present the subject of considerable secrecy, we cannot answer all the questions fully.

1st. The advantages over silver printing, which the process is alleged to possess, are greater simplicity in working, and superior delicacy and permanency in the prints. Of the two first mentioned qualities, we can speak from personal observation. Nothing can be more simple than the manipulations, and apparently nothing more free from uncertainty or difficulty in obtaining good results. The paper is prepared as easily as a plate is coated with collodion, the printing is carried to the exact depth required in the finished print, the toning and washing are effected in a few minutes. There appears to be no difficulty in getting any desired tone, without any tendency to mealiness or other defect. The prints appear to be as delicate, brilliant, and perfect, as it is possible to be, without the vulgar glare of albumenized paper. Of the permanency, we cannot speak from personal knowledge, but we shall refer to this again.

The comparison between this process and carbon printing* is not easy to make at present, inasmuch as the especial and undoubted charm of permanency in the latter is not yet proven in regard to the former. In beauty, the prints are about equal: in simplicity of working, the advantage is on the side of uranium: in permanency, at present, on the side of carbon: in cost, we have no data upon which to base a comparison.

2nd. As to the materials used, we cannot speak of them all with certainty at present. We can only say that there is paper, collodion, uranium, and gold. The principle upon which uranium printing is effected is this: a soluble persalt of uranium has the property of being changed by the action of light into an insoluble protosalt. The usual method has been to use a solution of the nitrate of the peroxide of uranium. Paper prepared with this, and exposed under a negative, will exhibit a faint image of citrine tint. There are various modes of changing this image into a deep toned and vigorous picture, by treatment with silver, gold, iron, mercury, or other solutions. But in this process a fine vigorous picture is obtained at once, which may either be retained in its bistre tint or toned with gold. We believe the use of collodion is new for this purpose, and the effect is very excellent. We cannot state what salt of uranium is used in the present process; the oxalate and other salts, as well as the nitrate, being available.

3rd. We cannot at present speak with confidence of the question of cheapness. Important as this question may be in an economic sense, we hold it really as one for secondary consideration. The primary question in all new processes is: are the results equal or better to those produced by existing processes? If there were a single iota lost in beauty or other artistic quality, we should condemn the process at once. If, as in the present case, there is really an advance in quality, then other questions become important. It appears to us probable that the cost of working the new process will be less than that of silver printing, inasmuch as the value of the uranium salt and the collodion together will probably be less than that of silver, whilst the cost of labour must be very much less. It is probable, moreover, that for this purpose collodion made from very cheap materials will answer every purpose.

4th. The question of permanency is one on which we can at present scarcely offer an opinion. Indeed, is impossible to offer one of any value in relation to a secret process. The permanency of uranium printing has in time past been the subject of much very sharp discussion. Half a dozen years ago, M. Niepce de St. Victor, one of the early workers in this direction, said:—"Photographic pictures with a salt of uranium combined with a salt of gold, of silver, or mercury, resist, without disappearing, the energetic action of a boiling solution of cyanide of potassium: aqua regia alone can alter them. Everything, therefore, leads to the hope that pictures taken in this way, will be much more stable than the photographs taken by the present process, and that this new mode of printing positives, so very simple and rapid, is the sought-for solution of the important problem of the absolute fixing of photographic pictures."

On the other hand, M. Humbert de Molard answered, in the French Society: "It has been asserted that the nitrate of uranium resists the action of boiling cyanide of potassium. I submitted a part of a proof to cold cyanide, and in five minutes that part of the picture had disappeared. I submitted another portion of ioduretted cyanide, and it disappeared immediately. I employed successfully hydrochloric acid, aqua regia, an aqueous solution of bromine, chloride of iodine, hyposulphite, and in fifteen minutes nothing remained of it. Ammonia alone did not deteriorate it; on the contrary, it improved it. In fine, I would not ask more than five minutes to destroy any proof taken with the nitrate of uranium." It is quite possible that M. de Molard's statements may be true without militating against the permanency of the prints. Caustic potash will destroy a carbon print, and the fire will burn it; but since the print is not intended for such treatment, and will never, in the course of its history as a work of art, need to submit to the ordeal described, it is not a matter of moment whether it will bear it or not. How far the new process will bear such tests, we cannot tell; how far they are permanent, we cannot tell. When the details are published, photographers will be able to judge of the probability of the permanency, and in the mean time the prints may be submitted to the tests of damp, exposure, foul air, and other agencies, whereby they may, to some extent, anticipate the action of time. M. Wothly has done this, we understand, and we fancy that Col. Stuart Wortley and the Hon. Warren Vernon are too experienced and accomplished as photographers to invest a heavy sum on behalf of the new association without being well satisfied as to the truth of the claims made for the process.

5th. The origin of uranium printing processes is due to our own countrymen. The germ or principle upon which they are based is contained in the iron processes of Sir J. Herschell. To Mr. Burnett, we believe, the first production of uranium prints is due. Shortly after him, and, possibly as an independent discoverer, M. Niepce de St. Victor published the results of many researches in this direction. M. Wothly has been for some years working in the same direction, and his labours appear to have been crowned with the greatest success.

6th. As to the validity of the patent, we can say nothing at present; and until something is proved to the contrary, it is only fair to conclude that it is a legitimate and valid patent. It is possible, of course, that the process may have been published before; it is more than probable that, should the process become popular and successful, many persons will be disposed to fancy that they knew all about

* In a letter received from Mr. Swan, he says:—"I have read the various accounts of Wothly's new process with extreme interest, anxious, as you may imagine, as to its bearings on the commercial success of carbon printing, which, you know, we are making rather extensive preparations to carry out. And yet I feel heartily glad, too, at the prospect of another great advance in the progress of an art that I love." With a generous and honourable competition between two important processes, the art must necessarily be advanced.

it before. We are free to admit that, whilst we have worked with uranium and secured uranium prints, we have neither produced ourselves, nor seen produced by others, uranium pictures at all comparable to those we described last week; and unhesitatingly add our conviction that if the permanency be as certain as the prints are beautiful and the process simple, a revolution in photographic printing must follow their introduction.

On uranium printing, generally, we shall have more to say in our next.

COPYRIGHT IN PORTRAITS.

A somewhat curious case, illustrating the ambiguity of the present law of copyright in photographs was heard before Mr. D'Eyncourt on Thursday week. The details are as follows:—

Clerkenwell.—J. F. Daniel, a photographer, of 8, Regina Road, Tollington Park, appeared before Mr. D'Eyncourt to answer an information which had been laid against him by Mr. Alexander Lamant Honderson, a photographic artist, of 49, King William Street, City, for infringing the copyright of the photographic portrait of Franz Müller.

Mr. Beard appeared for the complainant; Mr. Lewis for the defendant.

It appeared that Mr. Henderson about Christmas last took two portraits for Müller, but not liking one of them, the latter would not have it, and the negative remained in Mr. Henderson's hands. On the 3rd of August Mr. Henderson registered these portraits, and afterwards published them. The defendant obtained a copy, and then began to pirate the portrait. The difference in the pirated copy and the original was very manifest, the printed copy being much blacker than the original. The case for the complainant was that he was the author of the portrait, and although he had no agreement in writing from Müller that he might publish it, yet that the negative was his, and that he had the only right to use it. No attempt was made on the part of the defendant to deny that the copies taken from his house and produced in court were copied from the original as registered by Mr. Henderson; Müller paid him 5s. for the copies he had taken.

Mr. Lewis took an objection to the copy of the registration, stating that it was not complete. He also contended that a photograph of a person was not such a photograph as was intended by the Act of Parliament. What was intended were subjects different from the human being. He also contended that no consideration had passed for the portrait, and that there had been no agreement in writing, and that therefore the complainant's title was bad.

Mr. Beard replied that the objections were frivolous, and that the complainant had fully made out his case, and was entitled to protection. There had been no publication of the portrait prior to its resignation. It was quite clear that the defendant could not claim a copyright in the complainant's negative, and the complainant had sworn that he had never parted with the possession of it. He contended that the complainant had a right to do what he pleased with the portrait that he had of Müller, but which Müller did not like, and cited many instances to show that rejected articles became the property of the persons who made them. He concluded by stating that the decision in this case was looked forward to with great interest by all persons in the trade.

Mr. D'Eyncourt said the case was one of some importance, and he would take time to consider his judgment.

The collateral question arising here, independent of that in dispute, is an interesting one to photographers: To whom does a rejected portrait belong? To the photographer, will be the unhesitating answer from every one, and with it we cordially agree. But the next question which arises: Being the property of the photographer, has he a right to dispose of it to whom he may please? To this question the answer is not so easy. It will scarcely be affirmed that the unsatisfactory portraits of sweethearts, wives, or daughters, may be published and sold at the will of the photographer. We remember a story of a certain nobleman of penurious habits and ill-favoured countenance, refusing to accept and pay for, according to agreement, a portrait for which he had sat to a celebrated painter. He was not pleased with the picture, and declared it was not worth the money.

"Your lordship is quite at liberty to leave it," quoth the painter. "I can obtain more for it."

"How so?" returned his lordship. "It is valueless to anyone but myself."

"I shall simply paint a tail to it, and it will make an excellent monkey!"

It is scarcely necessary to add that the money was paid, and the portrait sent home at once. In the case recently heard, the rejected portrait becomes popular as that of a reputed murderer. It appears highly probable, moreover, that the copyright will be declared the property of Mr. Henderson. It certainly cannot belong to anyone else. The copyright of a portrait, or picture, does not accrue to the artist if it be a commission, without an agreement in writing. But in this case the right to select and reject appears to ignore the existence of a commission. It rather implies, that the artist took the portraits at his own risk, allowing the sitter to purchase what he chose, and reject what he did not approve. If, then, the artist took the portraits at his own risk, the copyright distinctly belongs to him. This being the case, the question arises—to which we have already referred—has he a right to make any use he chooses of pictures, the copyright in which it is possible he may thus legally obtain? To this we can only say, that supposing the legal decision assume the form we have just indicated, the use to be made of the power would, probably, be simply a question of honour. No honourable man, no prudent man, in fact, would make use of a power which would render him notorious, or adopt a course which would drive every delicate minded person from his studio.

In the case at Clerkenwell, it is clear that Daniel has no claim whatever; and it is equally clear that his legal adviser's nonsensical remarks as to the Copyright Act not being intended to include portraits, can possess but little weight. But the ambiguity of the wording of certain clauses of the Act renders a decision a somewhat difficult and unsatisfactory task.

LIGHTING THE SITTER, AND ITS INFLUENCE ON SECURING BRILLIANT NEGATIVES.

BY VALENTINE BLANCHARD.

So much has been already said on lighting the sitter, that notwithstanding its great importance, we fear it is looked upon by many as a used up subject; as, however, if we may judge from the number of photographs to be seen everywhere, in which, apparently, no attention is paid to the manner in which the light falls on the model, we trust we may be pardoned if in the course of the following remarks we repeat much already known, to those who have given attention to this important subject. An inspection of a number of photographs lately sent for criticism, and an after examination of some of the negatives, has suggested the reason why so many photographers find it necessary to intensify their negatives very much before they are enabled to produce from them anything like presentable prints. We frequently have occasion to show to pupils, and others seeking advice, the kind of negative we aim to produce, and the exclamation from all invariably is, "I should have thought it impossible to print from such a negative." It is easy to understand this surprise when the fact is stated, that the highest light in the negatives referred to is not much denser than the shadows of many negatives regularly produced and printed from. It has been repeatedly stated in these columns, that if the deepest shadow in a negative be represented by perfect transparency of the glass, the other part may be comparatively thin, and yet the negative may produce good results; but either the importance of this fact is altogether overlooked, or, more probably, it has been found difficult with the ordinary arrangements for admitting light into the room, to produce a negative possessing these peculiarities, without, at the same time, getting one so thin and deficient in detail as to be altogether unprintable, and therefore useless.

The cause of this difficulty we believe to be extremely simple. Photographers are too ready to let the light in on all sides, in order, as they imagine, to shorten the exposure.

Their end, however, is not gained by this means, for it must be remembered, that it is not so much the quantity of the light as the compactness of it, which produces the best results, for it must be remembered, that *only a limited quantity of direct light can fall on the sitter and background*, and all over this quantity falls on the sides and floor of the room, to be again reflected iuto the shadows of the picture, and worse than all, into the front of the lens; and thus it is that so much intensifying of the negative is needed, in order to produce anything like vigour in the finished picture.*

Another great cause of flatness is due to the imperfect exclusion of sunlight from the room. Of course it is imperative to shut off direct sunlight from the sitter, or from the front of the lens; but many are too indifferent about its appearance on the floor of the studio, the effect of which is very injurious in two ways: the reflections are thrown upward into the lens, producing the appearance of fog on the negative, and also on the face of the sitter, producing that strange unnatural effect in the eyes, witnessed only on the stage, and which renders necessary so much painting on the part of the actors or actresses, to neutralize its disagreeable appearance. There are others, again, who are particular to exclude all direct sunlight from the room, but who are content with one thickness of white blinds to shut it out, which, by the way, is totally insufficient, for one square foot of filtered sunlight, if the phrase may be permitted, is as active as a yard of ordinary diffused light. It will, therefore, be seen, that a small black screeu on the shadowed side of the sitter is not sufficient, and it will always be found better to completely exclude all trace of sunlight from the shadowy side, and employ instead, when needed, a white screen to throw such reflections as are required to lighten up the shadows. To those about to build a studio, we would strongly recommend the employment of ground glass on the sunny side of the place, and even then to exclude all the light by the employment of dark blinds when the day is very bright, and to employ only a small portion of the ground glass, even on dull days.

The late Mr. Lacy, whose pictures in all those higher artistic qualities have never been surpassed, and rarely equalled, used to employ with wonderful effect a small portion of ground glass on the shadowed side, instead of white screens; but the quantity was infinitesimally small, rarely exceeding a few inches, and then the sunlight was much neutralized by some roofs on that side of the studio. The light so used was, therefore, much subdued, and was only admitted exactly on the side of the sitter, and produced that softening of the shadow outline so much admired in the works of the great masters. This beautiful effect gave a strong individuality to his pictures, and is rarely to be seen in the photographs now produced.

From a number of experiments, extending over years, we are satisfied that eight feet of side light, and the same quantity of roof light, is sufficient for all purposes, and the best results are secured when all the rest is completely shut out, and we never by any possibility use more, for, in order to cool the place during the heat of summer, we have boarded over all the rest of the glass. The gain in comfort to both operator and sitter has been immense during the past few months, for, whereas, before the alteration, the glass house was a Turkish bath ready to hand, it has been lately as comfortable as an ordinary room. If, therefore, the light be admitted in a solid mass on the sitter at an angle of 45°, and all other reflectious carefully excluded, excepting those purposely arranged for effect on the picture, and if the front of the camera be well protected from light, we feel sure there will be no difficulty in securing with the same exposure negatives which will need little or no after intensification.

* It will be seen that Mr. Blanchard's remarks here, and throughout this article, strikingly corroborate and illustrate some of our own remarks on "Lighting," last week. As he had not seen our article when this was written, both articles, in fact, reaching the printer at the same time, this independent corroboration is the more interesting.—Ed.

PHOTOGRAPHY IN INDIA.

BY T. PRYCE.

Having read with considerable interest the two artieles on photography in India, which appeared iu your *Journal* of the 13th November and 20th May, I determined to act upon your suggestiou, and send you a few notes of my photographic experiences in Java, trusting they may prove acceptable to some of your readers. I shall be glad if this contribution may be considered as a small return for the many valuable hints which I have from time to time gleaned from your columns.

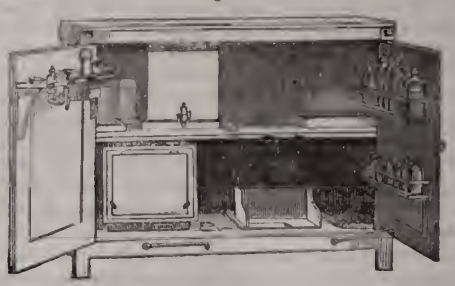
The photographer in India has many difficulties to contend with, which in Europe are scarcely known, or experienced in a much less degree. The heat, sometimes almost intolerable, the dust, the glare, the non-actinic quality of the light; the slight but constant wind, which keeps almost every leaf in motion, the dense and dark foliage, all produce difficulties, for the surmounting of which no ordinary amouut of patience and perseverence is required. Add to these the expense and difficulty of procuring good chemicals, and the dampness of the atmosphere, which seems to delight in damaging everything to which it has access, aud some idea may be formed of the troubles which have to be contended with.

I have tried several descriptious of dry plates received from Europe, and also some which I made here. The long exposure and uncertainty of action are great drawbacks to the use of dry plates, and until some improvement is made in their manufacture, wet collodion will be found more satisfactory to work with in this climate. Nothiug is more annoying than to return home with a box of dry plates, exposed in places which may never be revisited, and to find them turn out badly.

The tent being an important point in successful landscape photography, I shall give you a minute description of the one which I use, and which was made here on a plan of my own. Some time ago I ordered a much advertised tent from Europe, which although very ingeniously contrived and portable, proved quite unsuited for use in India. This tent was in every respect too small for working large plates, or, indeed, any plates with comfort, and the heat inside, owing in a great measure to the low top, was perfectly unbearable. The tent itself required some care and time to erect and pack up again, and the chemicals and apparatus were earried in a separate box which had to be opened and repacked every time the tent was used. Packing up is a fatiguing and troublesome operation, especially after a hot morning's work.

The tent which I have contrived can be set up by a native servant, the camera mounted, and the chemicals put ready at hand, in a very few minutes. It is very roomy, so that largo plates can be worked iu it with ease, and it is as cool as a tent in India can be. The tent can, moreover, carry two cameras, and a sufficient supply of chemicals for some months' operations. I shall give you the dimensions of the

Fig. 1.



tent which I use, and which you will observe is very large; the wood-work is also very substantial, and will bear any reasonable amount of wear and tear. Such tents can of course be made smaller and lighter to suit different require-

ments. In this country any increase of size or weight is merely a question of a few pence extra, for an additional cooly or two to carry the tent, an outlay which is amply repaid by the comfort and ease of having a good roomy place to work in.

Figure 1 is a view of the tent packed ready for a journey, everything being inside the case, excepting the iron tent rods, which may be strapped or tied together and carried on the top. The dimensions of the case outside are: length 4 ft. 3 in., breadth 2 ft., height from ground 3 ft. 3 in.; the legs are 4 in. long, and serve to keep the lower shelf from the ground. The upper shelf contains a zinc water tank 12 in. each way, with stand; a zinc tray, 20 + 14 × 2 in., painted to prevent rust, having underneath, at one corner, a short pipe for insertion in an india-rubber tube, which carries off the waste water clear of the tent; a box containing various articles, namely, screws for fastening the ends of the tent rods, towels, two large black velvet focussing cloths, one imitation leather ditto, wash leather, silk for polishing glass, camel-hair brush, plate glass dipper, a reserve silver wire dipper in case of accident, two or three china saucers for developing, silver dropping glass, india-rubber waste water tube, brush for cleaning plates, spirit lamp with screw top, matches, candlestick with yellow shade, blotting paper, filtering paper, and any extra chemicals which may be required. The water tank fits firmly into one corner, and is fastened by a couple of laths nailed to the shelf, the tray is laid on the shelf, and held in its place by the short waste pipe at the corner, which passes through a hole in the shelf. On the tray, the box of sundries above mentioned, and the rolled up tent cover, are placed. The tent cover is made large to reach over the whole case to the ground, and have a few inches to spare, so as to prevent light coming in through the bottom of the tent. It is made of stout drill, dyed black, and lined, first with black, and then with yellow calico, and is impervious to the direct rays of the brightest sun. A square hole may be made at the back, and covered with two or three folds of yellow calico; but I always work with a candle in the tent. At the opening, the edges overlap for a couple of feet, and two or three buttons are placed inside, so that the tent may be fastened, to prevent the edges being blown open, when working. The lower shelf holds a box for two dozen plates 10 × 8, one ditto ditto $6\frac{1}{2} \times 4\frac{3}{4}$, one ditto ditto for the large stereoscopic size $7\frac{1}{4} \times 4\frac{1}{2}$, all fixed in their places between laths, a Kinnear's camera for plates 10 × 8, with a Grubb's landscape lens, focussing glass, and dark slide 10 × 8, containing a loose frame for plates $6\frac{1}{2} \times 4\frac{3}{4}$. The lens is on a sliding front, which can be immediately removed, and another slide, with a Voigtlander portrait lens, put in its place. The camera slides into its place, between two laths on the shelf, and remains opened when travelling. Next, a binocular camera, with landscape and portrait lenses, focussing glass and dark slide. Two firm tripod stands, made without hinges in the legs, are strapped to the back of the case inside, and the triangles and screws fit into grooves near them. The portable glass bath is placed in a wooden stand, and fastened to the shelf by a lath and catch. The slide with the large portrait lens is secured in the same way. Between the glass bath and bath case a piece of thick cloth or felt should be placed, to protect the bath from concussion and fracture. A small box containing weights and scales (with glass pans) is placed in one corner.

The doors open in the middle of the case, and are fixed in their places, when open, at right angles, by means of iron hooks and staples. Upon the inside of the doors, double shelves are placed, in which all the bottles containing the necessary solutions are fixed. Each bottle fits into its proper place, passing through a hole in the upper, and resting on the lower shelf, and can be taken out when required, and replaced immediately. The bottles are quite secure in travelling, and I have never had a single breakage. As a precaution, however, the focussing cloths may be folded lengthwise, and placed between the tops of the bottles and the doors, which will effectually prevent them shaking.

The bottles for solutions and chemicals are: one 3-ounce collodion pourer, filled, 10 ounces iodized collodion, 12 ounces plain collodion, 4 ounces iodizer, 20 ounces extra bath solution, 20 ounces distilled water, 20 ounces iron developer, 10 ounces pyrogallic ditto, 10 ounces cyanide fixing solution, 5 ounces varnish, 5 ounces alcohol, 5 ounces acetic acid, 5 ounces mixed ether and alcohol, 4 ounces protosulphate of iron, 1 ounce pyrogallic acid, ½ ounce carbonate of soda, 2 ounces silver intensifying solution, 4 ounces tripoli cleaning paste, and 2 ounces nitric acid for cleaning obstinately dirty plates. To these are added a couple of graduated glass measures, a couple of glass funnels, and a tumbler, which makes the best developing stand.

The four tent rods fit into square iron sockets at the corners of the case. The two rods at the back are straight, and rise perpendicularly to the height of 7 ft. 6 in. from the ground; the two in front are bent at right angles towards the operator, for the distance of 2 ft., and then rise straight to the same height as those at the back. Between the tops of the upright irons are four light rods for keeping the supports and the tent in their proper places.

(To be continued.

NEW ARTIFICES IN THE EMPLOYMENT OF THE STEREOSCOPE.

BY M. MC. A. GAUDIN.

The application of the stereoscope to photography has been one of the most fruitful that this charming art yet received. Previous to this powerful auxiliary, the use of the stereoscope was limited to linear geometric designs, the lines of which were submitted to certain rules of a peculiar perspective, which resulted only in monstrosities when the representation of figures in relief was attempted. By the aid of photography, every natural object has since been rendered with striking fidelity, when, however, care has been taken not to exaggerate the effect of perspective, a course mistaken at first, and which for a long time gave publicity to the most grotesque productions.

The most remarkable effect of the stereoscope applied to photography, has been to cause the complete disappearance of the shocking disproportion in the limbs situated in front of the body, in engendering aerial perspective in the foreground, which, so to speak, remained latent previous to the employment of the optical illusion which forms the fundamental basis of human vision in all its perfection.

This is so true, that the most beautiful photographic proofs, remarkable for their large dimensions, as well as for the combination of all the qualities which constitute the excellence of the drawing, cannot fix the attention more than a few seconds without satiating the mind; unless we regard them through the hollow of the hand with one eye, which gives them a stereoscopic effect, and immediately excites a charm. The precise form required by the application of the stereoscope is no detriment, except that the pleasure is limited to one person at a time; but if the visual angle has been properly observed, the picture assumes the amplitude of the natural object, and the eye can range all over it, without fatigue, as happens in viewing the finest photograph of large dimensions with both eyes.

The stereoscope admits of a certain tolerance which permits of the establishing of several categories of pictures;—black upon glass and upon paper; coloured, translucent, and, lastly, with luminous points added by the hand, which represent, ill or well, the effect of lamps, gas lights, and illuminations.

Mr. Breese, for one, has succeeded, with the aid of an ingenious artifice, in representing moonlight views, although it is now shown that in these pictures the moon has been made to produce its image afterwards. Every means are good, provided they result in the production of illusion, as the works of the greatest artists have no other origin. This brings us to the description of certain artifices which appear to me not to have yet been employed.

In proofs obtained by long exposure, the sky is always uniform on account of the extreme mobility of the clouds, and no medium exists between a uniform sky and a sky supplied with its natural clouds; this very often necessitates the covering of the sky with an opaque coating, from which results very great difficulty in following with the pencil the very delicate outline of objects projecting against the sky: so that this coarse kind of plastering almost always spoils the proofs by rendering this stratagem evident to the least practised eye, on account of the deviations, which are never identical in the two proofs. The method I now proceed to describe appears to me to be susceptible of creating a new kind of sky intermediate between the uniform skies and the natural skies, and which is very easily executed.

It would, for instance, be very easy for a painter to represent the clouds upon a negative with a uniform sky, already slightly marbled by the trace of clouds, by making to act upon this sky a little brush of such degree of stiffness as to gradually thin the film of reduced silver without tearing it: but to produce clouds identically the same upon two proofs by separate operations, will be impracticable, and the eyes applied to the stereoscope will not fail to recognise the discrepancy. But if we mount two similar brushes on a horizontal bar, fixed at a given distance from each other, it is evident that upon putting the two brushes in motion, they will act simultaneously, and if kept in the same horizontal line, the work will be found identically the same on both proofs, and the distances will be regulated as in all the rest of the picture. It is only clouds that are suited to this kind of work, because of their cottony nature; and besides the facility of execution, this modification of the skies will give a result often more artistic than the uniform flat skies, plastered in with great difficulty in chrome yellow or indian ink.

For illuminated stereoscopes, the outline of the spaces to be cleared is distinctly marked upon the picture by the gas-lights themselves, and when they are few in number the operation is easy and successful: but if the subject is an illumination or a firework, the human hand becomes powerless; still, in the production of the effects of light, these two effects are among the finest and most worthy to be represented.

The light of gas-burners is fixed as quickly as can be desired, the light of a firework is instantaneously reproduced; what is indispensable to success is to make use of the artifice employed by Mr. Breese for representing the moon, which, moreover, is that which I have employed upwards of twenty years to obtain gas-lights in lamps at the time of the daguerreotype.

The conditions to be observed are: First, to obtain a very weak proof, which is very easily done. Second, to mask the sky. Third, to await the coming of night to obtain the luminous points, and unmasking the object anew. It is evident that we must operate with dry collodion, while during the interval the apparatus must be kept immovable, and that to wash and unmask the sky, we cannot dispense with employing a movable screen of tissue placed in front of, and at sufficient distance from, the objective.

For a firework, the sky cannot be too dark, as being the ground upon which the design must be subsequently displayed. By combining these arrangements, very curious effects may be obtained with a high degree of perfection, and which will come out in the printing, without the necessity, as in the old method, of operating upon each proof with manual labour, which, moreover, in these two cases would be impracticable.—*La Lumière.*

A NEW STEP IN PHOTOGRAPHY.*

Few of the arts show such signs of vitality as the infant one of photography. It would be strange, indeed, if an art which has so much of novelty and marvel about it, which gives to idlers the most graceful amusement, and to workers the most splendid results, which interests equally the man of science and the lover of art, which yields not merely a livelihood, but immense gains to many who practise it, and which is, nevertheless, in its infancy, should not display great vigour and make continual progress. One more step of a mighty progress we chronicle to-day—a step that, though small in itself, is of immense importance, and amounts to a revolution in photography. It is the step by which, now, at last, we can produce a permanent print. Englishmen and Frenchmen have hitherto carried off the chief honours of discovery in photographic science; but this last discovery is the work of a German. To explain more clearly what he has accomplished, we propose to state as rapidly as possible what has been already done in the science.

It is not very long since Wedgwood and Davy failed to fix the image which sunlight impresses, and had long been known to impress upon any surface impregnated with nitrate of silver. Documents exist which prove that though pictures on silvered paper were obtained about the commencement of the present century, no means could be found to fix the fleeting image. Disheartened by continued failure, our men of science let photography go to sleep, and nothing effectual was done in it until, excited by the discoveries and speculations of Niepce de St. Victor and others, Daguerre obtained pictures on metal plates that promised permanence. The application of vapour of iodine to the silvered plate gave the Daguerreotype image, and this process was the pioneer of all the so-called "negative" processes now used in photography. Scarcely had the beautiful process of Daguerre been made public when our own countryman, Mr. Fox Talbot, made a further step in advance—one which at once gave a great practical value to the photographic art; he discovered the means of producing upon paper so-called "positive" images of the objects to be pictured. Independently of Daguerre, he had succeeded in producing negative images on paper,—that is, images in which the conditions of light and shade are the reverse of those existing in nature, the shadows being represented by lights, and the lights by shadows. He now succeeded in printing from this negative any number of positive images, in which the lights were lights, and the shadows shadows. It was a vast stride, and that which followed was also vast. It was recommended by Le Gray that collodion should be used as the vehicle for the sensitive salts which, spread out in a film, receive the sun picture. The practical mind of Archer seized the idea, and spreading the collodion on a glass plate, discovered the means of obtaining very much increased delicacy of detail—a negative picture of far greater value than paper could possibly produce. Thenceforward to the present time various improvements have been made in the process of taking the original negatives. Greater sensitiveness, and, as a consequence, greater rapidity of action have been imparted to the collodion film; and this negative process now leaves little to be desired, save and except one thing—the means of impressing the sensitive surface instantaneously with any kind of picture. Instantaneous pictures of great beauty have been obtained, and chiefly by Colonel Stuart Wortley, but they are for the most part confined to the representations of objects brilliantly lighted. Save for this defect of instantaneousness, the method of taking negatives on a film of collodion spread over glass is well nigh perfect.

It is in the process of transferring the negative image into a positive one many times repeated that the chief difficulty of photography now arises. A perfect negative having been obtained, it is necessary to print off hundreds and thousands of copies on paper. The paper itself, and the materials with which it is prepared, as the albumen and the nitrate of silver, vary not a little in their action—vary, indeed, so much it is rare to get twenty copies of any individual photograph that shall be all alike. Worst of all, the materials used in the preparation of the prints contain within themselves the elements of destruction. The most important materials used in the preparation of paper for printing positives are albumen and nitrate of silver. A film of albumen lies upon the paper, and the surface of it is prepared with silver to receive the print, which is then submitted to various washing processes in order to render it as permanent as possible. All questions of permanence, however, it is difficult to establish, and when we come to consider them we are reminded of the wise youth mentioned in every Greek *Delectus*, who, hearing that ravens live a hundred years, kept one to see if it were true. Unfortunately, it is not necessary to wait so long in order to discover that the great majority of photographic prints are certainly doomed, and that the chances

* From *The Times*.

are against all in which silver and albumen are used. Nitrate of silver is so difficult to work, and so uncertain in its effects, besides being expensive, that men of science have long been on the look-out for some other metallic salt that would take its place. The nitrate of uranium has been tried, the ammonio-citrate of iron, the chloride of gold, and so on, but hitherto with little success. The nitrate of uranium seemed to promise permanence in the results which it gave, but these results were attained with great difficulty, and were only in rare instances of a fine quality.

The new process which has been discovered in Germany by Herr Wothly, and from him has been named "Wothlytype," discards nitrate of silver, and discards albumen. For the former it uses a double salt of uranium, the name of which is at present kept secret; for the latter it uses collodion. We have explained that by the ordinary method, the paper to be printed is sized with albumen, and the surface of the albumen receives the silver preparation, which is sensitive to the light, and shows the printed image. The paper thus does not receive the image, but is, as it were, a mere bed on which lies the material that does receive it. By the substitution of collodion for albumen, a different result is reached. In the first place, the film of collodion on the paper yields a beautiful smooth surface on which to receive the image, and the result is, that pictures are printed upon it with wonderful delicacy. In the second place, the collodion before it is washed upon the paper is rendered sensitive by being combined with the salt of uranium. The sensitiveness, therefore, is not on the surface alone of the collodion film, it is in the film itself, and so completely passes through it, that even if it be peeled away from the paper, the image which it received will be found on the paper beneath. The vehicle thus employed is not less superior to all others yet known for printing the positive image on paper, than it is to all others yet known for receiving the negative image on glass. The metallic salt which combines with it has also rare merits. In the first place, the manipulations are very simple and easy,—far more so than in the silver-printing process—and thus the labour saved is considerable. Next, the paper, when rendered sensitive for printing, or "sensitized," as the photographers say, keeps perfectly for two or even three weeks—an immense boon to amateurs, who can thus have their stock of printing paper "sensitized" for them; whereas at present, when the paper receives the sensitive preparation, it has to be used almost immediately, and will not keep more than a day or two. Thirdly, the colour and tone obtained are very various, including every shade that can be got by the ordinary silver plan; but, in addition, it has the advantage of being able to print any number of impressions of exactly the same colour, and of doing away with all such difficulties as show themselves in mealiness and irregular toning. The precision of result is a great point. By the silver process, the results are never certain, and even when the print comes out perfect from the frame, the subsequent process of washing and fixing go seriously to alter it. Lastly, the permanent character of the new method is very remarkable. Nobody seems to know exactly why the old silver process gives way—whether it be on account of the albumen, or the nitrate of silver, or the hyposulphite of soda. We only know, that so many of the prints prepared by the old method fall away, that no reliance can be placed in those which seem to stand firm. We know how apt silver is to tarnish, and especially in atmospheres that abound in the compounds of sulphur. Some photographers seem to think that it is this sulphur which does havoc to their labours. Whatever it be, ordinary photographs fade or darken, or in some way alter, and give us little hope of the fixity of those which still hold good. If it is the sulphur of the atmosphere or the albumen that does the mischief, then this which tells so much upon silver has no effect upon uranium; and the images pictured on paper prepared with uranium and collodion, give every prospect of lasting as long as the material holds together. These pictures have been exposed to sun and rain for weeks together, and give no sign of alteration. Water seems to have no effect upon them. We have seen them spit upon, as a schoolboy spits on his slate and rubs it dry, and after this rough process they showed no sign of difference.

The "Wothlytype" presents some other advantages on which we need not now dwell. Its chief excellencies are those we have mentioned—that it works with exceeding ease; that it is certain in its results, the impressions being all alike; that the sensitive paper will keep for weeks ready for use; and that when it has received the printed image it will stand an amount of tear and wear, and wind and weather, which no other photographs will bear. The process has been purchased from its German inventor by a photographic company of which Colonel Stuart Wortley is the chairman. Colonel Stuart Wortley has long been known as one of our foremost amateur photographers. Some of his instantaneous pictures, especially his pictures of clouds, are among the finest things yet achieved in photography. As the chairman of a company which calls itself the United Association of Photography (limited), he advised the purchase of the "Wothlytype," and has secured the patent rights of it as far as this country is concerned. How the company will use their patent it is for themselves to determine; but, hitherto, patent rights in connection with photography have been so difficult to maintain, and the progress of the art so swiftly renders them null, that it is to be hoped they will see the wisdom of liberality, and give licences to use their patent on easy terms.

A NEW METHOD OF ESTIMATING SULPHURIC ETHER.

BY MM. REGNAULD AND ADRIAN.*

The purity of ether is commercially estimated by its density, but this is not a rigorous mode of determination, since it is disputed what instrument is to be used. There is also the incorrectness in the graduation of commercial instruments, and, moreover, the temperature is not taken into account.

Some degree of regularity is attained by using a gravimeter, but by itself this determination is insufficient, since the ether is mixed at the same time with water and alcohol in variable proportions.

The first step towards obtaining a correct estimate is to simplify the nature of this complex product.

Having ascertained that carbonate of potash completely dehydrated ether, the authors found that the same salt brought alcohol mixed with ether to 98° centesimal without going beyond.

These points established, they base their process on the estimation of the degree of purity of ether by determining its density before and after the action of dry carbonate of potash. They have arranged a table so as to dispense with calculation. The proportions of pure ether, alcohol, and water contained in any ether can be determined by two gravimetric experiments.

Note.—The temperature for the two experiments should be kept rigorously at + 15, and the shaking of the mixture with the dry carbonate of potash, which is effected in a stopped flask, should last from twenty-five to thirty minutes.

Proceedings of Societies.

North London Photographic Association.

The first meeting after the recess of this association was held in Myddelton Hall on the evening of Wednesday, the 21st ult., Mr. G. Dawson, A.M., in the chair.

The minutes of a preceding meeting were read and confirmed, and the following gentlemen elected members:—Mr. E. Ellis, Mr. S. R. Hill, and Mr. Bott.

As there was no paper provided,

The Chairman called attention to some of Mr. Pouncy's carbon prints, and to some silver prints from the same negative; the carbon prints being, in his opinion, quite as good. He also called attention to some prints produced by a recent improvement in the process, which, Mr. Pouncy informed him, rendered the exposure no longer than that of silver printing. He then briefly described the process.

After some conversation on the subject,

Mr. Wharton Simpson observed, in answer to a remark that there was a want of sharpness and delicacy about some of the prints, that he thought this was probably more due to the negatives than to the process. Had Mr. Pouncy been more fortunate

* *Chemical News*, from the *Bulletin de la Société Chimique*.

in the negatives used he believed the prints would have been as crisp and delicate as could be desired. The fuzzy look which some of the prints possessed would doubtless be seen in silver prints from the same negative. He had seen prints by Mr. Pouncy's process which had no lack of delicacy.

Mr. Shave said that so much excellence having been obtained, the question of expense would probably determine whether carbon would supersede silver. Was the relative expense of the two processes yet determined?

Mr. Simpson said it would be difficult to arrive with any certainty at that for some time to come. Silver printing had been so long established, and so much studied, that everything was reduced to its simplest form and minimum cost. Carbon printing was at a disadvantage in that respect, inasmuch as everything was to learn as to its commercial working.

After some further conversation,

Mr. Bockett asked if it were quite satisfactorily proved that carbon prints were as permanent as had been alleged, or that silver prints were really not permanent? Carbon itself was of course permanent, but was the paper on which they were printed quite free from liability to change. Even in old engravings the whites sometimes became yellow. Some old silver prints had stood, and it was important not to condemn silver printing too hastily because some prints had faded.

Mr. Simpson thought that in speaking of the change in the paper, Mr. Bockett was over-looking that whilst a thing might be permanent it was not indestructible. Some silver prints had stood well, and he believed that when all the operations were conducted with proper care, silver prints possessed a very large amount of stability; but still, the very nature of the materials rendered them less permanent than carbon prints.

Mr. Bockett thought it was probable that want of permanency in silver prints was frequently due to impurities in the paper.

Mr. Lonsdale remarked that the warm tone acquired by the paper of engravings from lapse of time was regarded by connoisseurs as a beauty, whilst the same thing in photographs was regarded as a defect.

Mr. Simpson said, if the colour of the old photograph were the same as that of an old engraving, probably little fault would be found with it, but the yellow tint of a fading photograph was far from being agreeable or artistic. Moreover, photographers had come to regard this tint as the indication of decay, and it was naturally looked upon with suspicion and dislike.

Mr. Bockett said that the impure rags employed by paper-makers was doubtless a source of evil. Was it possible to obtain a paper in which no chlorine for bleaching had been used.

Mr. Lonsdale said a paper known as J. D. Harding's, for drawings, was made without chlorine, from pure white rags.

Mr. Hill said that all old paper would discolour, but he thought that photographers ought to look for their photographs retaining their colour as long as the paper of books.

The Chairman said that the presence of traces of chlorine left in the paper would not be injurious, inasmuch as it would at once be converted into chloride of silver. He thought the hypo used as "antichlor" was more likely to be injurious. Other adulterating substances were doubtless employed in the manufacture of paper.

Mr. Shave referred to the importance of paper-makers preparing a pure sample from pure rags for photography.

Mr. Simpson said that offers had occasionally been made by makers in this country to prepare a pure paper. He had himself tried some of the examples so issued, and had had the misfortune to find them the most unmitigated rubbish possible. He did not think they were made for photography at all, but simply samples selected from stock by persons really not knowing the requirements of photography.

After some further conversation, the subject dropped.

The Chairman then called attention to some negatives by Major Russell, prepared to illustrate the cause of "blurring" in tannin plates. The negatives were taken in bi-lens stereo camera, the back of one half of each had been painted yellow, which prevented the blurring; and the other left as it was. He thought that one would convince members of the truth of the theory that blurring was caused by the light passing through the film and being reflected back again to inner side of the sensitive film. One of the negatives was on orange glass, which prevented the reflection and the blurring; one or two of the films had been transferred, and showed the effect very plainly.

Mr. Shave asked if this blurring were not peculiar to the tannin process. He had never met with it in Fothergill plates.

Mr. Foxlee suggested that the use of ground glass for the negative would be a good test, as it would destroy reflection.

A Member asked if black velvet at the back of the slide would not have a similar effect.

The Chairman said it would not.

Mr. Bockett said he had not met with the defect in Fothergill plates.

Mr. Shave thought that its absence in Fothergill plates pointed to some other cause than reflection.

Mr. Simpson thought that if blurring were due to an optical cause, blurring should be presented in Fothergill plates as much as in tannin, as the films were as transparent. But from the complaints made, it was clear that this blurring was much more common in tannin plates than any other, and it was to his mind more probable that it was due to some peculiar chemical conditions than to an optical cause. An artificial light was very unfavourable for examining the negatives satisfactorily, but so far as he could see, where there was blurring on one side of the negatives, it was present on the other also, and he was inclined to think that the negative on the orange glass showed some of the same tendency. From the evidence that had come under his attention, he was inclined to regard the blurring as the result of lateral deposit in developing, a much greater tendency to which was present under some chemical conditions than others. Moreover, he found some photographers were never troubled with this defect at all in tannin plates, an immunity they could scarcely enjoy if it were due to optical conditions, which were certainly less likely to change than chemical conditions.

Mr. Shave said that many films more transparent than tannin appeared to be free from this defect, which could scarcely be the case, if it arose from reflection.

Mr. Ross said that apparent transparency and transparency to actinic rays, were not always the same thing. In examining some negatives previously of Major Russell's, he had certainly thought that reflection, as the cause, was fully made out.

Mr. Simpson pointed to the experience detailed at the Marseilles Society, of the difficulty of securing the fine tones in copying engravings on tannin plates. This appeared to him to be due to the same cause as the alleged blurring, namely, the lateral deposit of a light object encroaching on to the dark object, and filling up or blurring fine lines. It was very marked in some conditions of the wet process, especially where a simply iodized collodion and pyro developer were used. In such case, the reduction was rapid, and the tendency to lateral encroachment marked. A bromide seemed to retard reduction, and check the tendency to this defect.

The Chairman said the negative he held in his hand, which had been transferred from the glass, proved that the blurring could not arise from lateral deposit, as the side which had been painted from the back was free from it, whilst the unpainted side showed it very clearly. The reason why it occurred sometimes with tannin plates, and not at others, was because some films were more chemically opaque than others. The reason why tannin plates were more liable to this than others, was because the film was sensitive throughout, whilst albumen films were often only sensitive on the upper side. He had noticed it in the wet process, when the film was thin, and the light very bright, and in collodion positives, it was not uncommon. Positives on dark glass were, however, quite free from it, as there was no reflection.

Mr. Shave thought that any reflection ought to be apparent in the various transparent parts where light objects occurred, instead of in the sky only.

Mr. Simpson said, on examining the negative to which the Chairman had called attention, he saw very clearly the effect to which he referred. A deposit extended beyond the sky towards the transparent edge of the plate. This being at the edge of the photograph, it was quite possible might be from reflected light, but it was certainly not blurring in the sense in which he understood the word, nor in the sense in which complaints of the defect had so often reached him. The fine lines, or the outline of the landscape, were no more blurred in the image at one side than on the other, so far as he could see. By blurring, he understood the encroachment on to fine lines coming against the sky, obliterating or injuring them. He had seen this defect occasionally in Daguerreotypes where there was no reflection; he had examined many thousands of glass positives,

but certainly was not familiar with this defect as peculiarly common amongst them.

Mr. Foxlee had seen blurring in glass positives.

A Member suggested that the deposit on the end of the plate referred to by the Chairman was due to an imperfect slide, which let in light.

Mr. Shave asked if it was not possible that it was simply fog from diffused light.

After some further remarks of a similar tendency,

Mr. Simpson said that if the defect could be traced to a chemical cause, it was within their power to remedy it; but if it were due to an optical cause, it was beyond their control, and the remedy suggested of painting the back of the negative would be, he feared, tantamount to condemning the process altogether, as it was robbing the tannin process of one of its great charms, simplicity in manipulation.

After some further conversation, the subject dropped.

Mr. Johnson then showed some very charming specimens of panoramic photography, and also exhibited the camera, and its mode of working.

The Chairman called attention to a doublet lens by Mr. T. Ross, and to some of its productions, an especial characteristic of which was their freedom from distortion. The combination consisted of two menisci lenses, with a stop between. The front lens was achromatized in the ordinary manner, and the back in the manner employed in what is known as the aplanatic lens. The lens had a focus of 9 inches, and was intended to cover 10 by 8 plates. The stops were attached to the lens, and were brought into position by rotating them. The largest stop was one-twentieth of the focal length, and the others, respectively, one-thirtieth and one-fortieth. A flap shutter of metal was attached to the lens.

Mr. S. R. Hill exhibited a reflecting camera.

Mr. Ross exhibited a number of Dr. Van Monckhoven's enlargements.

The Secretary intimated that the next meeting, which would be held on the 19th October, would be special for special business.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris 4th Oct. 1864.

M. Gaudin, referring to the process for wet collodion without the nitrate bath, described in the Photographic News, No. 315, states that it is very similar to a particular kind of collodion which he described some years ago, under the name of *photogene*. It was obtained by introducing iodide of silver direct into the collodion, instead of producing it by the immersion of the collodioned plate in the nitrate bath.

This modification, which appeared so simple at first blush, presented numerous difficulties in practice. In the first place, the iodide of silver instead of being on the surface of the collodion, as in sensitized plates, was found to be buried in the substance of the collodion itself, and on that account it became in great measure inaccessible to the developing agents; so much so, that the negatives have often only about one-tenth of the intensity of ordinary proofs: this, then, is the first difficulty:—In the second place, the collodion being formed of alcohol and ether, in which nitrate of silver is insoluble, we cannot determine the precipitation of iodide of silver by double decomposition, without introducing water which tends to coagulate the collodion, and it is also this coagulation, not of the collodion, but of the iodide of silver, which forms the greatest obstacle to the preparation of photogene of good quality. Now, the fact cannot be concealed, that for the iodide of silver to be sensitive to light, it must be in that peculiar molecular state which causes it to appear opaline, that is to say, of a yellowish red by transmitted light, and of a bluish white by reflected light. This state is very difficult of attainment in collodion.

According to M. Gaudin's researches, which have been very persevering on many occasions, he recognized the utility of adding organic reducing agents to make the photogenes work well. The reducing agent he has studied most is gallic acid. We can only with the utmost difficulty picture to ourselves the minute quantity necessary to produce the desired effect:—He believes it does not exceed a centigramme of gallic acid to the litre of collodion (1-100000th).

Then, after having introduced the iodide of silver into the collodion, it remains to render it sensitive, by immersing it in a solution of tannin, as proposed by M. Poitevin. That is quite another process, which also requires to be studied, and which may some day be important in certain cases.

M. Renault has published some notes on the history of protochloride of copper. In the month of April last he had occasion to prove that a plate of copper, which had served as the negative pole of a Grove battery in which zinc had been replaced by copper and the water acidulated with bichloride of copper, blackened quickly in the sun. This fact induced him to make some experiments on the subject.

Copper immersed in bichloride of copper, perchloride of iron, weak *aqua regia*, in a mixture of bichromate or chlorate of potassa and dilute hydrochloric acid, in protochloride of copper dissolved in hydrochloric acid slightly diluted; in a word, in any liquid which abandons chlorine more or less slowly, becomes covered with a grey coating, presenting under the microscope a continuous crystalline appearance, formed, *probably*, of protochloride of copper. This film becomes white in presence of a solution of ferrocyanide of potassium, then assumes a brown-red colour.

It turns yellow in the presence of air and water. Dilute solutions of sulphuric and nitric acid do not cause it to undergo any alteration, at least, when the contact is not too prolonged.

Cyanide of potassium dissolves it, as do also ammonia and carbonate of ammonia, hyposulphite of soda, cyanide of ammonium, hydrochloric acid more or less diluted, hydrochlorate of ammonia, sulphate of ammonia, iodine dissolved in iodide of potassium, and bromine dissolved in bromide of potassium.

But one of the remarkable properties of the cupreous chloride thus obtained upon the plate of copper, is the facility with which it changes to a certain thickness in the solar light.*

Its greyish white colour deepens more and more, when exposed to the sun's rays it becomes black, and acquires a metallic lustre similar to that exhibited by a fracture of Prussian blue.†

A stereoscopic negative placed upon a plate of copper sensitized by means of bichloride of copper, yields a positive picture of remarkable delicacy, without metallic reflection. If the film of chloride is sufficiently thin, the rose colour of the copper seen by transparent light presents a ground much more agreeable to the eye than the original Daguerrean plate.

The exposed plate, washed quickly in distilled water, gives no red colour with ferrocyanide of potassium, but the washing water gives a light precipitate of chloride with nitrate of silver.

Protochloride of copper obtained from its solution in hydrochloric acid dries rapidly when sheltered from air and light, and retains very little of its original white colour; exposed to the sun's rays, it becomes very slightly yellow; but if some drops of water are thrown upon it, each portion of the protochloride moistened passes successively through the yellow, grey, black, and violet tints before mentioned. The solvents of the chloride changed by light are the same, at least, those tried and noted above are, except that they exhibit a little less rapidity of solution in some cases than those of unchanged chloride.

* Diffused light alters it more slowly.

† At the high temperature of 570° Fah., the black colour of the plate disappears.

ENAMELLING PHOTOGRAPHS.

Sir,—My attention has been drawn to an article in your paper of the 16th, which gives the method of working the so-called enamel process in a very clear and simple manner. Now, sir, I beg to inform you that the above-mentioned method is no secret, having been used by myself and several of my professional friends for more than two years. About two years ago I offered the formula to a highly respectable photographic dealer for the consideration of £10, which he at the time declined: at that time I believed it to be unknown in this country, the only specimens I had seen were produced by a foreign house, which consisted of pictures of some of the royal personages, including one of the Princess Alexandra. It was that particular carte which struck my attention. I at once applied myself to discover how the same kind of surface could be obtained, with what success met, the specimens I produced at the time will testify. I found them very useful as specimens, but, in consequence of the extra time and labour taken up by the process I did not think it worth while to push them as a matter of commerce.

I have since made great additions to the enamelling, and have produced something new and original, which I shall be prepared shortly to submit to your notice. I enclose you a specimen, and my object in troubling you is to put the matter in a clear light to the trade generally, who are, I have no doubt, anxious to know how long the patent right has been taken out. The methods I have used are several, and the old transfer of positives to leather was my starting point, the collodion being in all cases the first principle, the method of adhesion being varied. I have succeeded best by avoiding all adhesive matter, and have got the best results with rectified spirits only.—I beg to remain, sir, yours most respectfully, George Willis.

Londesbro' Terrace, Scarboro', Oct. 4, 1864.

[Nothing can exceed the beauty of the specimens enclosed by our correspondent, and we shall have much pleasure in receiving his further communication. The patent under which the process is claimed is four years old, but we do not think that Mr. Squire has any intention of enforcing it, if on enquiry such an act can bear the slightest semblance of unfairness to photographers.—Ed.]

SUNDAY PHOTOGRAPHY.

Sir,—In the mention of the Exeter case, I was surprised to find the subject of Sunday Photography so lightly spoken of, for it is a very important point. Photography is indeed a beautiful art, and no one can say to what extent it may benefit mankind; experiments are continually made and very successfully too.

Photographers are a class of educated and intelligent men, but as every rule has its exception so has this, for instance, an advertisement appears, "Wanted, a *Sunday* operator." Men not satisfied with the profits of six days continue their work on the sabbath. I did not know till lately it was so common and so public that a man should advertise respecting it. Such things as these lower us in society, and by the acts of some all suffer. What society would a well-to-do (I cannot say respectable) grocer or draper find, if he opened his shop on Sunday? He would be shunned by the respectable, they would not associate with him; then, why should a photographer become *lower* than a petty grocer or draper in that he *publicly* does what they are ashamed to do? Who are the Sunday sitters? The lowest of the low, the scum of our town. What Sunday society for an artist! He risks all for a few shillings, which are hardly earned, for respectability and happiness are lost.—Hoping, sir, I have not occupied too much of your valuable space, I remain,

A Subscriber.

THE PATENT BLINDS.

Sir,—Mr. McLachlan's last letter to you is not a bad specimen of his thin-skinned irascibility, and of the error and perversion into which his frantic haste has led him. He has displayed himself in his true colours, yet not fully, for he must be both seen and heard to be fully appreciated. It would be a painful but not a hard task to give a similar history extending over a number of years past.

I am quite at a loss to see what he seeks to gain by removing the veil from my signature, nor do I see how he is attacked in my letter relating to Mr. Eastham; the only reference to him is when describing the timber ribs of the roof being of considerable depth, and having been put up long before Mr. McLachlan's patent was thought of, and not, as he would perversely have you understand, being part of a scheme adopted only a fortnight ago. The fact is, Mr. Eastham had no occasion to pay royalty at all, as will appear from my letter; and his doing so arose from feelings which do him much honour, but which I am not at liberty further to allude to.

Mr. McLachlan's loose regard for truth is shown in his referring to my call upon him, which would seem to have been on a Sunday. Your readers will judge for themselves whether that is likely or not. The rest of his account of the interview is equally probable.

It is scarcely necessary for me to refer to this implied charge against me of having written the letters from Mr. Brothers, from Ashton, and from "Difficulty." He might as well say I wrote Mr. Gulliver's, particularly as that gentleman's name coincides with one celebrated in fiction, which might raise a doubt as to whether he did really exist in the flesh, or as merely a creation on the part of some imaginative correspondent.

Mr. McLachlan's idea of a circle appears to be rather limited, and not in accordance with theories on that subject, being confined by the obliquity of his own mental vision, it could hardly be expected to be.

But to come to his astounding assertion that I wrote him a note signed "Sympathy," enclosing a flash note; how shall I deal with the absurdity? I know not sufficient of your typographical secrets to be aware how strong language you will permit to be used; the only word I can find applicable is one which I think even your P. D. would be staggered at; and as it would be accompanied with the strongest expletive the language is capable of, would rather sully than adorn your pages. I must really again let your readers judge for themselves. I am quite content to abide by your declaration, as to whether I am or am not likely to have committed such an indiscretion, but I must demand from Mr. McLachlan the proof he says he has, or failing that, as he will, such an ample apology as I and my legal adviser may be satisfied with, a proceeding which will prove Mr. McLachlan a very unworthy member of a confraternity the very emblem of which is truth.

I trust it is the last time, indeed, that we shall hear from Mr. McLachlan about the invention of "my blinds," as he dubiously words it, or about any other subject. Samuel Cottam.

[We have watched this controversy assuming the personal phase with considerable pain, and have inserted the last two letters simply to avoid the possibility of the slightest seeming injustice to either party. We are certain that the whole fraternity of photographers will agree with us, that it is more than time the discussion should cease, and must do so now so far as our pages are concerned. In a controversy of this kind, we are very willing to believe all parties animated with honest, even if with mistaken intentions, at the outset; but few persons see clearly during the excitement and smoke of battle, and are very liable to make errors, which in calmer moments will bring regret. If our advice or influence have any weight, let us urge upon all concerned to be content with the assertions and denials already made, to bury their animosities, and forget the quarrel. Above all, avoid law, in which even he who wins the cause generally gains a loss.—Ed.]

Sir,—The last letter from Mr. McLachlan is so deliberately at variance with the truth, that to remain silent on my part might be construed into assent to what he says.

I beg to say, most positively, that no person ever waited on Mr. McLachlan from me as my "legal adviser," or in any way whatever at my request or on my behalf, excepting the solicitor whom I employed to pay the £5 (which was extorted from me under the plea of royalty), in order to have the matter legally settled, and to avoid further annoyance. The money was paid on a Saturday, therefore, the "day after," on which the "legal

adviser" is said to have called, was Sunday. How far does this agree with the fact so positively asserted? And I would enquire what end was to be gained by my requesting anyone to see Mr. McLachlan *after the money was paid?* Mr. McLachlan's memory appears to be as treacherous in this matter as in others connected with this case.

With respect to the authorship of the letters, I have only to say that no one but myself has had anything to do with what I have written, not a line or a word was suggested by any other person. But if people are incompetent to write their own letters, I presume suspicions of the integrity of others are engendered. If I mistake not, the "main part" of the correspondence has had Mr. McLachlan's signature attached, and I maintain that he has no right to enquire whence the correspondence issues if it is to the point. I can only speak for myself, and I say again that the letters with my name are as genuine as this. I never employ others to write my letters.

All this, however, has nothing to do with the validity of the patent, and when I read that Mr. McLachlan claimed his "right to reply," I imagined that we were at last to be favoured with answers to one of the questions which have appeared in your paper, but there was nothing of the kind. It would be better, I think, to keep to "the question," rather than endeavour to ferret out the authors of the letters which have exposed what some have called an "imposition."—Yours truly,

A. Brothers.

[We have received this letter since the above note was written. The matter must now drop. It would have been better had it done so many weeks ago.—Ed.]

Photographic Notes and Queries.

The Manufacture of Chloride of Gold.

Sir,—In your impression of September 23rd, we notice under the above heading a description of "the way this article is manufactured on a large scale for sale," and as we are, we believe, the largest makers of chloride of gold, we do not like to pass it without comment. The *proportions* of acid named are *not* such as we use; and we do not allow either "washing soda" or "whiting" to enter into the manufacture of our article, our object being to get the preparation as *pure as possible.* Our process is longer than that of Mr. F. G. Eliot, and we get rid of an impurity which is not spoken of in his formula, and which exists to some extent in *all* commercially pure gold.—We are, sir, yours respectfully,

Johnson & Son,
Assayers to Her Majesty's Mint.

Talk in the Studio.

Fargier's Carbon Process.—There appears to be considerable misapprehension regarding this process amongst photographers, many of whom seem to imagine that it belongs to the public and is free from the trammels of patent. Such, however, is not the fact. M. Fargier applied for a patent not only in France, where his claims were opposed by M. Poitevin—with what success we don't remember—but also in this country. We have before us his specification, sealed October 16th, 1861, and the patent is now in force throughout the United Kingdom. It is somewhat singular, moreover, that the recently proposed modification of attaching the gelatine film to paper, instead of coating it with collodion, before development, is included in the specification of the patent.

M. Crozat's Enamelling and Colouring Process.—We have received from several correspondents enquiries regarding a proposal made by M. Crozat of Seville to sell certain recipes for £5. The circular which he issues describes in glowing terms the promised advantages, and he encloses a very charming enamelled vignette photograph, with a slight tint in the cheek as a specimen. To those who are quite ignorant of the method of producing the effects shown in the print, we don't think £5 would be a heavy sum to pay for the knowledge. Those, however, who have been careful readers of our pages will perceive at once the mode in which the effects are produced. The "double ground" is simply produced by the method more than once described in our pages by Mr. Harmer and Mr. Cooper. The enamelling by the process described in the News four years ago by Herr Liesegang, and more in detail recently by Mr. Tunny and ourselves. The "instantaneous colouring" is a little pink in the cheek, which the picture would be better without. The process is described as patented. This doubtless refers to a Spanish patent, as M. Crozat has no patent that we know of in this country.

Glass Clips.—Mr. G. C. Wallich sends us a specimen of an improvement in the glass clip to hold excited paper, the improvement consisting in a simplification of the manufacture and diminution in cost. Instead of using a piece of cylindrical glass as the fulcrum of the clip, a portion of the india-rubber tube is made to perform that office. One-half of the tube is cut through within an eighth of an inch of the end; one of the pieces of glass only passes through the whole of the tube, the other piece is then placed through the cut aperture, the eighth of an inch of the tube beyond being thus pressed down to form the fulcrum. The glass is also bent at one end to form a hook. Mr. Wallich adds:—"I may also mention that I have made a most efficient plate-holder on the same plan, stout plate-glass being substituted for that employed in the smaller clip, and the necessary increase in the height of the fulcrum being secured by fixing permanently to the india-rubber cylinder one or two thicknesses of the same material at the part referred to. In this case I also roughen that portion of each of the surfaces of glass which grips the plate and surrounds it with a thin india-rubber band, thereby entirely obviating the risk of the plate slipping.

Art Students.—A return made to the Commons' Select Committee of last Session on the Schools of Art established in the chief towns in the kingdom, shows among the higher class of students, 2 Cambridge professors, 2 journalists, 62 clergymen and ministers, 38 solicitors, 83 physicians and surgeons, 28 apothecaries and chemists, 260 architects and their apprentices, 82 manufacturers and millowners, 106 merchants and shipowners, 57 landsurveyors, 665 clerks. Of course, there is a large number—1,513—of teachers, governesses, and pupil teachers, and 1,283 are returned only as schoolboys and schoolgirls. About half the students range under the artisan and industrial class, on whose behalf the Government has insisted, as a condition of State aid, on evening classes at 6d. a week. The return shows 692 engineers, 509 carpenters, 458 painters, 292 carvers, 264 engravers, 255 mechanics, 219 cabinetmakers, 215 builders and their apprentices, 213 masons and stonecutters, 146 designers, 129 draughtsmen, 110 pattern makers and designers, 95 iron manufacturers or workers, 79 modellers and moulders, 74 upholsterers, 73 jewellers, 70 lithographers, 74 shipbuilders and carpenters, 68 metal workers, 67 glass painters, 65 plasterers, 39 lapidaries, 38 photographers, 14 ornamental writers, 2 ticket writers. But the list is by no means confined to persons whose present calling requires art instruction. There are 81 shopmen and shopwomen, 63 drapers, 55 warehousemen and boys, 55 tailors, 54 smiths, 53 ironmongers, 47 farmers, 46 grocers, 42 coachbuilders, 37 printers, 30 bricklayers, 30 shoemakers, 30 weavers, 29 plumbers, 25 victuallers, 15 publicans, 24 watchmakers, 22 messengers and office boys, 20 Excise and Customs' officers, 19 mariners, 18 bakers, 13 butchers, 8 pawnbrokers, 5 policemen, 2 timekeepers, 2 church vergers, and, in fact, a much longer list than the reader would be willing to go through.—*Times.*

Suicide by Cyanide of Potassium.—Mr. Humphreys held an inquest recently on the body of a man named Joseph Freeman, aged 33, who had committed suicide by taking a dose of cyanide of potassium. The medical evidence was very important, and brought into prominence a public danger which the jury did not fail to comment upon in their verdict. The deceased had taken an enormous dose of cyanide of potassium. As much as three-quarters of an ounce was distilled from his stomach, and a portion was found still to be in the glass from which he drank, the poison having acted with such fierce destructiveness that he could not finish the draught. He had taken enough to kill one hundred men; for cyanide of potassium, said the surgeon in evidence, is the most deadly of all poisons, two grains and a half of it being equal to fifty drops of prussic acid of the Pharmacopœia, and yet it is the most easily obtainable of any poison, being used in the photographic processes. The coroner remarked upon this state of things. The jury found the following verdict:

"That deceased committed suicide by swallowing a quantity of cyanide of potassium while of unsound mind; and the jury wish to express their opinion that so dangerous a poison ought not to be sold in the shops without due care being taken to ascertain tho use to which it was to be put."

Relative Sizes of Ultimate Atoms.—Professor Gustavus Hinrichs, of Iowa State University, communicates to *Silliman's Journal* an article on the distribution of tho dark lines in the spectra of the elements, in which he reasons from the few facts yet known that these lines will probably be found at regular intervals in their spectra. He concludes that tho lines must bo produced by the bulk of tho particles or atoms, and that an exact knowledge of the laws and distances of their distribution must lead to a knowledge of the relative dimensions of tho atoms themselves, in length, breadth and thickness. Ho remarks:—"Thus optics will give us tho form and sizo, as chemistry has given us the weight, of tho atoms."

To Correspondents.

Photo.—You should have numbered the two diagrams for reference. We prefer that in which the camera portion is lower than the rest. With a north-west aspect, you may have a little sun late in the afternoon, but this may be remedied by the use of blinds.

G. M. Taylor.—The gum water should he applied cold after fixing and washing, before the plate has dried. We believe it is a safe remedy.

A. Wellea.—A very virulent case of imperfect fixation. The hypo is old or weak, and has entirely failed to fix the print; possibly the hypo itself is bad. But you want a fresh solution of greater strength.

F. S. S. Brown.—A quarter plate double combination may he used for landscapes without disadvantage with a small stop. Or the front lens may be unscrewed, and used alone as a landscape lens, but in that case the surface which is the front in the portrait lens, must be used as the back surface in the landscape lens. Many lenses are specially provided with arrangements for being used thus, but we don't know whether that in your possession has been so provided.

H. Gaant.—We addressed and forwarded the letter to its destination.

J. H. S.—We do not like carbonate of soda in a toning bath, especially if it be intended to keep. We have succeeded with most of the lune baths we have published; but perhaps the simplest is as follows:—1 grain of chloride of gold, and from 1 to 1½ of chloride of lime in 6 ounces of water. If you have reason to suspect the presence of iron in your common water, by all means use distilled water for the toning bath. If you have reason to believe that the chloride of gold contains much free acid, neutralize with carbonate of lime; but if neutral or nearly so, the the chloride of lime is sufficient. We are glad you have been successful, and are satisfied in the matter of the lens. Your conclusion as to the importance of lighting is very correct.

Pyro.—The yellow stains on your prints are the result of hypo in some shape or way. It appears to us probable that the prints have been rinsed, before either fixing or toning, in a dish which had been contaminated with hypo. It is impossible to exercise too much care to prevent the slightest trace of hypo to come near an unfixed print. It is possible that the discolouration is due to imperfect fixation, from the use of an old or weak hypo bath; but we think the first mentioned cause most probable.

N.—The varnish used by Mr. Spiller was the Schnee varnish. It is probable, from your experiments, that the constitutiou of the varnish affects the question. We will make some experiments on the matter, and report We will also bring the matter further on the attention of Mr. Spiller. The reason for not using varnishes which dry bright when applied cold, is, that such varnishes are rarely, if ever, so hard and pertectly protective as spirit varnishes.

A Subscaiber from the First.—Extend your side light further forward, so as to get three or four feet more of glass. Remove the blue colouring matter from your top light, and use blinds to be used down or up, as circumstances may require. The portion above the side light, adjoining the sloping roof, now wood, make glass. These appear to us desirable alterations; but if you had enclosed us a print or two, we could have formed a better opinion of the defects and remedy.

M. N. C.—We think, on the whole, we prefer Mr. Swan's method of transferring negatives, described in our pages on May 6th, using, however, Mr. Wenderoth's suggestion of treating the glass with a solution of wax in ether before coating the plate with collodion. The proportions are one ounce of gelatine and half a drachm of glycerine in one ounce of water Gelatine has been found the most satisfactory. With varnish on one side and collodion on the other, as described by Mr. Swan, the negatives, if preserved with care, are not readily liable to injury. The best plan will be to keep them between the leaves of a hook. It is an important consideration to get a tough collodion where large plates are to be transferred, and to use the wax. Mr. Swan's method is described in our number for May 6th, and Mr. Wenderoth's in June 10th.

Redhead.—We believe that about 40 cells of a Grove's battery have been found to answer for ordinary printing in the pressure frame, and about 34 Maynooth cells would be equivalent. We presume that the same light which answers for ordinary printing would, with a suitable condenser, answer for the solar camera, but we cannot speak from experience.

Alfred.—We have seen Crozat's specimens. They appear to be produced by a process identical with that described in the News on September 16th. You had better save your £5.

L. M. L.—We should say that the Sutton form of glass room will suit the place very well. It will be better with two side lights, but you may dispense with one, by the skilful use of reflecting screens. 2. We have no personal knowledge of the lenses you name, but if we selected either for card pictures it would be that of the larger focus. 3. Card lenses are generally of a little longer focus than ordinary quarter-plate lenses, and in some cases they have a flatter field. 4. For pinholes we can only recommend you to try the remedies we have published. We know many of the causes which induce them, hut, probably, not all.

E. W. Andaews.—We have not seen the mixture to which you refer, but it is probable from your description that a body colour prepared impromptu would answer every purpose. Chinese white, yellow oehre, and indigo, with a little gum water, would make such a background as you describe: the tint might he easily varied at will. But the result is never artistic, and is only useful to hide a defective background with little trouble.

R. A.—The advantages of a single lens over a portrait lens for landscape work are, more equality of illumination and greater uniformity of definition up to the edges of the plate, greater depth of focus, &c. 2. Probably the triple would combine the most good qualities. 3. The lens to which you refer would cover well up to the edges, without dark corners, &c., and without distortion.

J. Jamblin.—Thanks for the portraits of Gladstone. They are very excellent, better than most that we have seen published of the able Chancellor of the Exchequer.

A. W.—Your plan appears to be very good. You must take care to be well supplied with blinds to keep out the sun on the south side, or you will he a good deal troubled. We presume that the aspect is imperative.

S. Welch.—The greenish yellow spot is due to imperfect fixation. It is probable that your hypo may have been rather weak or exhausted. It is possible that an air bubble formed at that spot on the print, whilst in the hypo, may be the cause, and sometimes some defect in the paper will produce such a decomposition at the place, as to produce such a spot. If the toning bath be acid, especial care should be used to wash the prints before immersing them in the hypo.

Thomas Y. Davidson.—We are obliged by your interesting communication on a new Dialytic Achromatic Camera. After carefully considering the proposed plan, however, we do not find it differ much from the method of Dr. Van Monekhoven, by whom it is probable reclamations in regard to the principle would at once be made, and thus involve a controversy unprofitable to our readers. We shall have pleasure in seeing your remarks on the use of diaphragms.

A Very Grateful One.—The soap flatting for backgrounds, is prepared as follows: Take lamp black, white lead, and venetian red, in sufficient proportions to produce the desired tint; let them he ground up in as little oil as possible, and dilute with turpentine. Now shave into six ounces of boiling water, one ounce of common yellow soap; when this is dissolved, add it whilst boiling to a pound and a half of the paint, and mix quickly. When cold, it is ready for use, and gives a coat of paint which dries dead, and does not crack.

T. A.—Your communication and proposition shall have our best consideration, and we will answer shortly.

J. S. W.—We are reluctantly compelled to let your interesting communication on "Reproduction by Photography," and some remarks thereon, stand over uutil our next.

An article on the "Tannin Process and Blurring," with several communications in type, are compelled to stand over until our next.

Carbon, One Who is Weary of Novelties that are New, Progress, G. L., M. P. S., and others. See our second article in the present number.

Several correspondents in our next.

Photographs Registered during the Past Week.

Messrs. Redaway, Bros., Rudgwick, near Horsham, Sussex.
Photograph entitled "The Reverie"
Photograph entitled "Nature and Art."
Two Photographs entitled "The Young Birdsnester."

Ma. Joseph Wadsworth, 94, Broad Street, Islington, Birmingham,
Three Photographs of the Exchange Buildiugs, New Street, Birmingham.

Mr. R. Lloyn Beaad, 6, Duke Street, Cardiff,
Four Photographs of Master Percy Roselle, In the characters of "Shylock," "Dr. O'Toole," "Napoleon," and "Little Pickle."
One Photograph of Miss Amy Roselle, as "Portia."

Mr. C. J. Waight, South Street, Worthing, Sussex,
Photograph of Wedding Group on the Lawn of Heslington House, Worthing.

Mr. J. Port, 27, Union Street, Stonehouse,
Three Designs for Mounting Photographs, entitled "The Watchman," "The House on a Rock," "Weight and Measure."

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth,
Photograph of Rev. Henry Mackenzie, Sub-Dean of Lincoln.
Photograph of Rev. R. Cobb.
Photograph of Captain Beven.

Messrs. W. D. Downey, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of Earl of Durham.
Photograph of Lady Beatriee, Durham.

Mr. P. Hopwood, Bridgnorth, Shropshire,
Three Photographs of T. C. Whitmore, Esq., (of Apley Hall) and Family.

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THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 319.—*October* 14, 1864.

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A NEW SYSTEM OF PRINTING.

WE are about to bring under the attention of our readers, a new system of printing, different in principle and detail from any other of which we know, and one which may probably revolutionize the whole art of printing, by the press as well as by photography. It is distinctly different from any system of press printing, and from any system of photographic printing, although it possesses analogies to both. The principle is so novel, and its development may be so important, that we must ask the patient and careful attention of our readers, whilst we endeavour to explain the mode of working and its results.

Before doing this, however, it may be well to state that the originator of the system we are about to describe is Mr. J. W. Swan, whose carbon process is now before the public. When Mr. Swan was in London, in April last, for the purpose of reading his paper before the Photographic Society, he described to us, in confidence, certain experiments upon which he was engaged, for the purpose of securing efficient press printing processes by the aid of photography. The system in question was one of these; but he wished to bring it to a successful practical issue before publishing either the idea or its details. He has favoured us from time to time with examples of progress, but has not yet, from pressure of other duties, had time to fully develop the process. A few weeks ago, however, Mr. Walter Woodbury, of Manchester, called upon us, for the purpose of showing us examples of his experiments in producing photographs in relievo and intaglio, and transparencies in porcelain, obtained by applying the same principle. In the course of our interview, he produced a rough print obtained by the very method which Mr. Swan had described to us some months previously. Thus the same idea had occurred to two gentlemen independently. Mr. Woodbury did not, however, regard the principle as capable of very successful application, whilst Mr. Swan regards it as of the utmost importance, and capable of the most valuable development. He has now removed the seal of privacy, and we are at liberty to publish the idea, and describe such results as we have seen produced by the two gentlemen named.

We now again invoke the attention of our readers. There are five distinct modes of printing or multiplying, from a cliche, pictures or designs. *Block printing*, or the method of producing impressions by inking a block with raised surfaces, and obtaining a copy of such raised surfaces by pressure, upon paper or other fabric, as in wood engraving, &c. *Intaglio printing*, or the method of producing impressions by filling up with ink lines or hollows in a metal plate, then cleaning the surface and obtaining a copy of the lines and hollows by pressure, which causes the ink to be transferred to paper or other fabrics, as in copper-plate printing. *Lithographic printing*, or the method of producing impressions by applying ink to a design upon a stone, the design having an affinity for the ink, whilst the other portion of the surface repels the ink, the design so inked being obtained upon paper by pressure. *Photographic printing*, or the method of producing an image by the action of light through a negative, upon a surface which is darkened by the action of light. And *Carbon printing*, or the method of producing an image by the action of light through a negative, upon a soluble substance which is rendered insoluble by the action of light, and so imprisoning any colouring matter incorporated with it, and thus yielding a design in such colour.

In each of the three first-named methods, gradation of tint is obtained on the same principle; the ink applied is opaque, and the thinnest, as well as the thickest, layer of it should be black. The gradation, or variation, in depth in the image is obtained by the design being formed of lines or dots: when the lines or dots are large and very close to each other, a very deep tint is produced; when they are fine and wide apart, a light tint is produced; an absence of either lines or dots to receive the ink leaves the paper white, and a continuous surface to receive the ink produces a breadth of black. But in no case is there gradation of tint in a continuous surface, or what is termed a flat tint. In photographic printing, gradation is obtained on a different principle: lines or dots, hatching and stippling, are unnecessary. The gradation is obtained by degrees of depth in a continuous tint, like "washing," in water-colour drawing. It is the nature of this gradation, and its dissimilarity from that employed in ordinary printing, which has been the great difficulty in obtaining successful press photography.

In carbon printing, gradation is obtained without lines or dots, as in ordinary photographic printing, but the method of securing that gradation is again essentially different. It is obtained here by different thicknesses of a coloured translucent material on a white ground. The deepest blacks consist of a sufficient thickness of this material to become practically opaque, and cover the white paper upon which it is fixed, without allowing it to show through; the next depth of tint is obtained by a slighter thickness, which allows a trace of white to show through, producing the effect of deep grey; the other tints by varying thicknesses, the thinner the layer of the coloured translucent medium, the more delicate the tint of grey, as the white ground becomes more and more apparent, gradually merging into the pure white of the ground as the layers become attenuated to nothing. This mode of securing gradation embodies a new principle which has been scarcely sufficiently recognised in treating of carbon printing, and it is of the utmost importance in the process we are about to describe.

The new system of printing consists in a combination of the principle upon which intaglio or copper-plate printing is based, and that upon which the image in carbon printing

is obtained. An image in which the shadows are in relief, and the whites depressed, is obtained by exposing bichromated gelatine under a suitable eliche to the action of light, and afterwards to water. The details of the process may be varied, but we need not enter into them here, as the principle is well known. From the gelatine an electrotype is obtained with the lights in relief, and the shadows depressed, as in an engraved copper-plate. This is the block or eliche from which impressions have now to be obtained by mechanical means. It must be borne in mind that the intaglio so obtained represents by degrees of depth the gradations of the image. This intaglio is now to be filled with a thick solution of gelatine, containing indian ink, or other colouring matter mixed with it; when slightly set, and the surface cleaned as in copper-plate printing, it is placed in contact with paper, the surface of which would be best prepared with gelatine, albumen, or collodion, to prevent it being absorbent; the block is then brought into firm contact by steady heavy pressure. The set gelatine and colour will be thus delivered on to the paper, much in the same way that the cook delivers a shape of jelly from its mould. The gelatine and colour so delivered on to the paper will in all respects resemble a carbon print. The deepest shadows will consist of a thick opaque layer forming blacks, each gradation from these to white consisting of a thinner layer of the translucent material.

We have confined ourselves here, for simplicity, to a bare elucidation of the principle, and the mode of putting it into practice. It will be seen that, the principle once understood, there are various methods of effecting the end, and using other materials besides gelatine and pigment, and various modes of applying the pressure, and working the mechanical details.

The principle is simply to apply translucent materials to intaglio printing, the intaglio in all cases representing depth of tint by depth of depression. The intaglio may be produced either by photography or may be engraved by hand; but the principle is quite applicable, independent of photography. This is the first method ever devised, we believe, of obtaining real gradation of a continuous tint, as distinguished from the artificial gradation of line or stipple, by mechanical printing, and one which may possibly on further development effect a revolution in art printing generally.

As we have said, it is not simply an idea, but has been put into actual practice, and we have some of the results before us. The print by Mr. Woodbury, although a rough experiment, was to us a very interesting and suggestive result; but Mr. Swan has made greater progress, and secured in small surface a considerable amount of true gradation, delicacy, and sharpness. He has sanguine hopes of obtaining the completest success, and producing perfect pictures, containing true photographic gradation with as much ease and facility as an impression is produced from a copper-plate. We hope shortly to have further details, and complete success to chronicle. In the mean time the principle is before our readers.

REPRODUCTION BY PHOTOGRAPHY.

In another column will be found an ably written letter by a correspondent well acquainted with his subject, questioning the soundness or prudence of our advice in a recent article on this subject. Our correspondent objects that, in regard to engravings, there is very little material in this country sufficiently interesting or valuable to promise much interest in a series of photographic reproductions. That in regard to paintings, photographic reproductions are unsatisfactory. And that it is doubtful in any case whether photographic reproduction, as a commercial scheme, would be remunerative. We shall make one or two brief observations on each of these positions.

In regard to engravings. To enter into a careful enquiry as to the engravings accessible in this country, sufficiently valuable, interesting, and scarce to warrant their reproduction by photography, would be a task for which we have neither time nor space now, nor does it fall within the scope of our duties. Were we commercially engaged in photography, we should, however, desire no better task. That any complete series of first class engravings of the best paintings in this country exists we do not affirm, but there is a sufficient number of choice and rare engravings accessible in this country to render their photographic reproduction a pleasant, a useful, and a profitable undertaking. We believe, to begin with, that an album of the early wood engravings, beginning with a copy of the "St. Christopher," the earliest known specimen of the art, and including the illustrations to the works printed by Caxton, would be readily welcomed by collectors, and would bring the photographer, if well done, both credit and profit. A complete series of the wood engravings of Albert Durer, and of the etchings of the same master, would be not less valuable or acceptable. Amongst the English engravers on copper, whom our correspondent names, there are several whose works are rare, and copies from which would be valuable; but he omits to mention one whose prints, from the paintings of Wilson and others, will at all times now command a high price; we refer to William Woollett. A good photographic series of the old mezzotints, single portraits, and larger works, very rarely equalled in the present day, would also be very valuable.

As regards the shortcomings of photography in rendering paintings, we do not for a moment deny it, but we believe that exaggerated notions prevail as to the extent of this shortcoming, arising from two causes. Copying paintings was a task which, in the earlier years of photography, generally failed in the hands of even the ablest men, and many persons much interested in the success of the experiment have taken these failures as conclusive on the subject. Again, many painters desiring to have their works copied, looking at photography with the narrow conviction that it is quite a mechanical art, have entrusted their works to the first photographer to whom it might be convenient, without the slightest reference to his capability, thinking that, in a mechanical matter, copying would be quite as successful with one photographer as with another. Thus the failures of incompetent persons have also tended to spread an exaggerated notion of the incapacity of photography in this direction. That it can in all instances duly translate colour, and render it properly in monochrome, we do not for a moment assume; that, in regard to some of the old masters, it utterly fails, we shall not deny; but we have no hesitation in affirming, that with the majority of paintings, especially modern, even admitting the importance of colour in the English school, photography can produce copies in which the qualities of fidelity, &c., largely compensate for others which are in some degree absent in photographic reproductions, and we point unhesitatingly to the works of Mr. Bingham, in France, and Mr. Thurston Thompson, and we may add Mr. Annan, in this country, in confirmation of our assertion. Each of these gentlemen have produced photographic copies of paintings full of colour, which have left very little indeed to desire, and that without working up one copy in monochrome from which to copy another, or any other trickery. Our correspondent pays our own judgment, and that of Mr. Tom Taylor, a very poor compliment, when he says, that the copy to which he referred in the remarks we quoted was most probably produced from a print. In order, however, to give duly to the opinion of the art-critic in question whatever force it may possess, we may mention here that the photograph was an undoubted and legitimate copy of the painting of an old master, Guido's "Aurora." We quote the passage from the *Times'* criticism of the Photographic Exhibition of 1861:—

Signor Dovizielli's large photograph of Guido's "Aurora" (taken in three parts), is an excellent illustration of the superiority, with all its drawbacks, over engraving as a medium of translating the painter's work into monochrome. How inexpressibly inferior to

this photograph is the best of the many engravings of Guido's masterpiece, and yet it has been fortunate in its engravers. But take the best in that sort, and we maintain that the best imitation which the burin of even a Strange, an Anderloni, or a Longhi can produce, would be poor and dead to such a version as this of the great work of the "Rospigliosi Palace." We say this with profound conviction, not unaware of the charges of heresy that such a profession of faith may expose us to from certain schools of connoisseurship. But were we sure that photographs of pictures would last, we are not sure that we should not be content to see engraving numbered amongst the extinct arts."

Our correspondent refers to the heavy risks and expenses of the publishers of engravings. One of the heaviest items of that expense is the engraving, which, except in the case of very popular works, is rarely worth venturing. If publishers and painters would give the subject a little more thoughtful consideration, we think they would come to the conclusion that many excellent works would pay for photographic publication, when they would not pay for the cost of engraving. And even with regard to the popular pictures which pay for the cost of engraving, and in regard to which our corespondent complains of photographic piracies, we think publishers might serve the public, and profit themselves, by issuing small photographic copies. It is probable that small photographic copies would, in many instances, merely serve as advertisements and aids to the sale of the large engravings, and would, by taking their place, drive more effectually out the piracies, which the law now prohibits. As we have said before, in France it is becoming common, and we believe that it will follow in this country, indications already existing of the tendency. We noticed recently that Martineau's finely painted picture of "The Last Day in the Old Home" was announced for publication by photography, and we trust it will be successfully followed by others.

In regard to the question, "Will it pay?" we shall say very little. We prefer to exclude the commercial element, as much as possible, from our photographic studies, giving consideration more to its artistic and scientific phases. We believe, however, as a general principle, that whatever is good to be done, will pay. That reproduction and publication do pay on the continent, there is already satisfactory evidence, and that they would also pay in this country, if properly carried out, we have no doubt. The fact that there is already a demand in England for Mr. Bingham's charming reproductions from French paintings is a confirmation of our opinion.

TANNIN PLATES WITH ALKALINE DEVELOPMENT—BLURRING.

We have recently received from Mr. Jabez Hughes a very perfect series of views of Osborne House, the residence of Her Majesty in the Isle of Wight. These have been taken on tannin plates, ten by eight, and illustrate in a more striking manner than we often see, the capabilities of the tannin process for securing every good quality in a photograph. The pictures are admirably delicate, clean, detailed, vigorous, crisp, and brilliant, wanting in no quality, in short, attainable in the wet process. In rapidity we learn that the plates in Mr. Hughes' hands are only second to wet plates, requiring, with alkaline development, an exposure only double that of the wet process with iron development. One of the pictures was pointed out as receiving, with a Dallmeyer's No. 1 triple, and a small stop, an exposure not exceeding thirty seconds, which was quite sufficient. The certainty, we understand, is not less than the excellence of the results, as, after a little familiarity with the working, failure is regarded as a contingency which may be left out of the calculation.

The details of the process are, as Mr. Hughes remarked, such as we have before published; but it may be interesting briefly to recapitulate the method used in producing the excellent results to which we have referred, one great advantage, it will be observed, existing in the fact that no special bath or collodion is required.

A good bromo-iodized collodion, such as is used in the studio for portraiture, is used for coating the plates, which receive no preliminary film of gelatine, india-rubber, or anything else. A nitrate bath having a slightly acid reaction, with nitric acid, again the same as is used in his studio for portraits. A moderately careful washing with distilled and common water. A coating with a fifteen-grain solution with tannin completes the operation, and the plate is left to dry. The plates have been exposed at various times after from one to five weeks keeping, without any deterioration having been observed: how much longer they would keep, remains to be tried. The plates have been developed a week or two after the exposure, how much longer they would keep well, is uncertain.

The exposure is regulated by the intended method of development. If the ordinary method of development with acid pyrogallic acid be intended, an exposure of from six to eight times that of wet plates under the same circumstances is given. If the alkaline development be intended, the exposure need not exceed twice that of wet plates.

The alkaline development is effected as follows:—The exposed plate is first varnished round the edges with a camel's hair pencil: this prevents any tendency in the film to leave the plate. The film is then thoroughly moistened with water. A solution containing from one to two grains of carbonate of ammonia to the ounce of water is then poured over the plate. If the exposure have been full, or if the solution be rather strong, a visible image begins to appear, but it is not important that it should do so. The stronger the ammonia solution, the more readily the image appears; but there is no advantage in this, and there is a chance of setting up tendency to fog. After this solution has remained on the film from half a minute to a minute, it is poured back into the developing cup, and pyrogallic acid added to it at the rate of about half a grain to two ounces of solution. This is then poured on to the plate, and the development at once commences in earnest. The image speedily appears in all its detail, but without any density. When it is fully out, the plate is well washed, and the usual intensifying solution of pyrogallic acid and silver with citric or acetic acid is applied until a moderate degree of intensity is obtained, which is readily done. The plate is then washed and fixed with hyposulphite of soda.

There is here a step in which Mr. Hughes departs very definitely from common practice. He does not aim to get the fullest amount of vigour desirable during the process of intensity, and for this reason: on examining a plate by yellow light, the density or thickness of the deposit only can be examined, without relation to the colour; but the colour of tannin plates varies somewhat under different circumstances, generally being, however, of a warm non-actinic hue. If the desired amount of opacity were obtained in the yellow light, it would often happen that from the red colour of the deposit the negative would be over intense; by stopping short of that intensity, then fixing and washing, the negative can be freely examined in daylight. If, then, the deposit be found to possess the peculiar colour which does not transmit actinic light, however thin the image, the negative is in good printing condition, whilst, if it be at all short of the density desired, it is easily intensified further. This process Mr. Hughes generally calculates upon being necessary, and is easily effected with pyrogallic acid and silver in daylight, which permits the right stage to be attained without the risk of going too far.

The exquisite delicacy and cleanness, the perfect technical excellence, over and above their interest as pictures, which these plates possess, and the simplicity and the certainty of the operations, have induced us to recapitulate that which in general principle may have been known before.

On the subject of *blurring* in the tannin process, we may have more to say shortly. It appears very probable from a correspondence we have had with Major Russell, that he has been referring to a defect by that name, different from that of which we have received many complaints. We will

merely add here that in the pictures to which we have just been referring, there is no trace of the blurring, and Mr. Hughes informs us that he has never met with it in a single instance.

COPYRIGHT IN PORTRAITS.

The judgment in the case to which we referred in our last as to a disputed copyright in a portrait of Müller, was given on Friday last by Mr. D. Eyncourt, at Clerkenwell Police Court. We quote the following report of the case from *The Standard*.

Infringement of the Copyright in Muller's Portrait.—The Judgment.—Mr. J. F. Daniels, photographic artist, of 8, Regina-road, Tollington-park, Holloway, was summoned before Mr. D'Eyncourt to answer the information of Mr. Alexander Lamant Henderson, photographic artist, of 49, King William Street, City, which charged him as follows:—"For that you, not being the proprietor for the time being of copyright in a certain photograph, did, without the consent of the proprietor thereof, unlawfully repeat, copy, and colourably imitate for sale and exhibition, a certain photograph of one Franz Müller, contrary to the statute," &c.

Mr. Maynard, from the office of Mr. Beard, attended for the complainant, and Mr. Lewis, sen., for the defendant.

The facts of this case have already been fully reported, and the matter stood over for Mr. D'Eyncourt to have time to consider his decision.

Mr. D'Eyncourt now said—This is a summons for breach of copyright. The 25th and 26th Viet., cap. 68, vests the copyright in photographs in the authors thereof, with certain exceptions and provisoes; and the main question is whether the complainant is entitled to the copyright in this photograph, or whether the proviso in the first section prevents his claim. Mr. Lewis took an objection that the Act was not intended to apply to photographs of this description. I see nothing in the Act to support that objection. It appears to me to apply to photographs generally. Had it been intended that the Act should not apply to photographs of individuals, an exception to that effect would have been inserted. With respect to the objections made to the entry in the register, I am inclined to think that neither of them are valid objections to the present proceedings; but I will come to the main objection raised on the part of the defendant, and founded on the proviso in the first section of the Act, viz., that this was a photograph executed on behalf of another person for a good or valuable consideration, and that the copyright was not reserved to the author by agreement in writing signed by the person on whose behalf the same was executed. As I understand the facts of the case, Müller requested the complainant to take his photograph. The first attempt was not approved of, and the complainant made a second attempt. Eventually Müller preferred the first to the second photograph, and took five copies of it, for which he paid 5s. Now, there can be no question, I think, that the complainant executed both photographs for Müller, and it is admitted that the copyright was not reserved by any agreement between him and Müller. The complainant, however, says that it was not executed for a good or valuable consideration, and, therefore, the proviso is not applicable. Now, it is clear that the photograph in question, which is the second that was made, and was afterwards rejected by Müller, was made at the request of Müller, and the only question is whether any consideration passed for the work so done. Mr. Lewis says that the mere sitting and the time occupied was a consideration, but without deciding that point, I think the 5s. which he paid was the consideration for all that was done. The photographer made two attempts with the view of satisfying his customer, and although Müller selected only one of them, the payment was the consideration of the labour of the artist, the consideration for both attempts. I think, therefore, the copyright in the photograph is not vested in the complainant, and must dismiss the summons.

We observed last week, that owing to the want of clearness in the Act, the decision on this subject was not a very easy matter; and with all deference to the worthy magistrate, we think now that his judgment is open to very considerable question. The first portrait ordered is undoubtedly a commission, and the amount charged, be it little or much, is, doubtless, legally a good and valuable consideration. But the second portrait is, we apprehend, taken by the artist at his own risk, without any consideration whatever but the prospect of pleasing his customer and selling some copies. If both portraits were commissions, then the artist would have a legitimate claim for two payments, which is a thing never dreamed of. Where a portrait is ordered, we apprehend that the first taken is a commission, and if two, or half a dozen be taken, to allow the sitter to select, it may be very easily decided that whichever be selected may be regarded as the commissioned portrait; but all the others being taken by the artist at his own cost and at his own risk, with the double object of pleasing his customer and of selling extra copies from some of the extra negatives, we think that, according to the provisions of the Act, the copyright therein would rest on the artist, not, in any sense, coming under the provision relating to commissions. The price of the portraits was five shillings for five copies; the sitter received five copies, and paid five shillings and no more. But one negative was necessary to the production of these portraits, and one was taken as a necessary part of the commission. The prints were obtained from this negative, and when delivered and paid for, the commission was completed. It is clear that no consideration of any kind was paid for the second negative. The artist took it at his own risk, with a prospective gain, which he might or might not secure, circumstances have transpired which have given the negative an especial value; and to us it appears that the copyright therein is undoubtedly the property of the artist, and any unauthorised copies are, in accordance with the provisions of the Act, piracies.

The other curious question still remains open, and is not raised at all as yet by any legal enquiry. Has a man any property in the portrayal of his own face? Can another obtain a copyright in that portrait without the consent of the original? Müller is not in a position to question the right of any one to make money of his countenance at present; but we can conceive circumstances in which the publication of a portrait might be very offensive to the original, and we are uncertain at present whether any remedy exists for the victim of such a possible annoyance.

JOTTINGS FOR OCTOBER,

BY A PHOTOGRAPHER'S ASSISTANT.

Ammonia Fuming.

The accomplished Editor of the *Mechanic's Magazine*, in a recently written leader, attempts a new definition of the *genus homo* which cannot be received but as a continuation of the many characteristics that form the line of demarcation which separates our race from the brute creation. Man, as usually defined by lexicographers, is an animal that exchanges, and the new definition alluded to proves an excellent and well founded addition which might with propriety claim a general adoption. Man is an animal that invents. "Taken in its broadest phase, *all men are inventors*, but accepted in its more rational sense, such interpretation must be brought within the pale of extreme limitations. An inventor (if deserving the name) is one whose constructive or designing powers are exercised in devising that which must benefit mankind generally. He may produce the germ only, but all who follow in his track may be designated as improvers; the only proper appellative by which they should be known, because they embrace ideas which would not have been theirs but for original minds where thoughts budded, drooped, and doubtless would have died, had they not so been transplanted to new and therefore vigorous soil. Progressive ever, like some frail plant, 'tis changed from soil to soil until the matured scheme doth bear the blossoms of perfection. Should we not then withhold awhile our measure of applause until we learn how many minds have spent their strength in rolling on a pace or two the schemes that claim our admiration? The noble river charms the eye, but homage seldom strays where tiny brooks, whispering soft music, flow on o'er many a rugged path to feed the massive waters. Men work on others' thoughts, then cry, "Success is ours." An admiring world accepts the boon, nor cares it to enquire how many weary anxious minds have borne the toil imposed by nature's axiom, progress. Without enlarging on this topic, or entering into personalities connected therewith, we recommend this hasty sketch to the attention of our photographic readers. Now turn we to our text.

October is a strange month, in which nature stays her sport and wears a solemn aspect. The dropping leaves keep ticking

as they slowly fall. The flowers vanish one by one, and the once gaudy, busy insect would wax heavy both on leg and wing, whilst the birds change from joyful song to saddened chirrup. Nature's day is spent, and the softened twilight bears us gently on to meet the rude blasts of her sterile night. The enterprising tradesman now invokes the typographer to aid him in his venture, by telling all the world around, in letters curious, straight, oval, crooked, disjointed, that Mr. Wideawake is prepared to supply goods suitable for the coming season. Coals are at a premium. "Alarming sacrifices" awaken the sympathies of the fair sex, for goods pertaining to summer are now such "loves of bargains;" preparations for winter meet our every step. Photographers should follow so excellent an example, by embracing every scheme that aids the power of light, by presenting to its rays the least resisting body. Strange, though many able minds have been employed in adding to the sensitiveness of collodion plates, so little thought has been directed to the no less important branch of photographic printing. The summer crop of negatives must be exposed beneath the dull, leaden sky of winter. Orders pour in thick and fast; easily given, but with such a feeble light, how hardly executed! The paper lies a lifeless leaf, an object to be sighed over, so that any method that may stimulate its feeble powers must be accepted as a boon.

When a nameless spirit was invoked by worthy Friar Bacon to instil life into the brazen head, that worthy recommended fuming. Photographers, go ye and do likewise, and then pour down blessings on the spirit that designed the plan, be he English or American. Take your Jupiter's spirit, ammonia, and proceed as follows:—From your lumber rooms, drag some cobwebbed chest or box of smaller growth, so that it hath a lid fashioned in seemly manner. About two inches from the top, inside the box, drive sundry nails on all sides: to these, tie fine wire, until it forms a wide meshed network; at the bottom of the box should stand a flat dish, into which pour a small quantity of spirit ammonia, and your machine is then ready to receive the paper, which, of course, must be laid upon the network after sensitizing either in the nitrate of soda or ordinary silver bath; we prefer the former. Allow the paper to remain a few seconds, and it is ready for the frames. It will at once be perceived why the paper is shut in the box; but the part ammonia plays will not so readily be understood. A little space may here be filled in an attempt to solve the mystery. Ammonia is a powerful alkaline agent; although capable of combination with bodies, we doubt its action, in the case in question, proceeds further than the destruction of acidity. Fuming yields all the properties of the ammonia nitrate bath without the latter's disadvantages. It produces alkalinity, a condition which experience has proved to be the best help to rapid reduction of the silver salts, whether in the form of an iodide or chloride. Why this should be, chemistry is not as yet sufficiently advanced to determine; probably, by the destruction of the stubborn acids, an equilibrium of forces is produced that causes the molecules which form compound bodies, when acted on by light, to relax their hold, and when the magnetic rays penetrate the interstices, without a struggle, the atoms separate for ever.

But to return again to the practical. The paper best suited for fuming purposes is the Rive medium, coated with pure albumen, and lightly salted; from four to six grains of chloride of ammonia is sufficient. Seeing that fuming tends to increase the violet hue in the printing frame, it is obvious that with a highly salted paper that yields blue prints without fuming, this colour must increase to an unsatisfactory depth when ammonia aid is accepted. It should ever be remembered that rich warm tones can only be secured by red or very warm coloured prints entering the gold solution. It is altogether an erroneous doctrine that teaches us to believe the gold to be a many hued colouring agent, the precious metal is the glaze, hence the necessity of preserving a vigorous strongly coloured body to receive it. In our earlier experiments with fuming, we experienced some difficulty in obtaining dark tones, but a brief consideration pointed to the cause. The prints were tinctured with that "Man of the Sea," alkalinity (so disastrous to toning operations, yet so tenaciously clung to). Gold solutions cannot digest it, get lazy, and refuse to work. Then, to prevent this state of things, we prepare a lotion composed of muriatic acid, about twenty drops; water, common, one gallon; after washing the prints in three waters they are immersed in the acid dish, allowed to remain a few minutes, another wash, and then for the toning. Before fixing, we pass them through a slight course of carbonate of soda, as any acid clinging to them might otherwise play mischievous pranks in the liberation of sulphur in the fixing bath.

We have finished; yet one word more. Try the fuming process, let your paper be thoroughly dry before shutting it up with the good spirit, let its imprisonment be short, have patience. Work intelligently, and success is yours; and then try the increased number of prints, you will be encouraged to bless the day when, instead of your passions, you applied the fuming to your paper.

PHOTOGRAPHY IN INDIA.*

BY T. PRYCE.

On commencing operations the tent should be placed in as shady and cool a place as possible; the doors are unlocked; the rods and tent cover put in their places; the water tank, tray, and bath set on the top of the stand; the cameras, legs, slides, and glass plates taken out, and everything is ready. In working, the operator has everything at hand, 4 ft. by 2 ft. clear space for working in, plenty of room over head, and not inconvenienced by having his arms or legs tied up in the folds of the tent.

Fig 2.

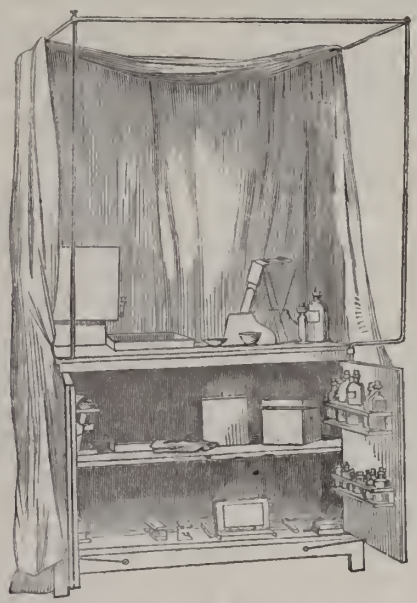


Figure 2 shows the tent in working order, the cover being raised and thrown back, to allow the inside arrangements to be more clearly seen. A list should be kept of all the articles in the tent, and, before starting, this muster roll should be called over to see that nothing is forgotten. After a journey, the stoppers of the bottles should be examined, as they may get loose from shaking in carrying. Before starting, care should be taken to have the bath, collodion, &c., in perfect working order; the glass bath, and especially the india-rubber cover, should be washed with scrupulous care, and the bath solution filtered in.

With regard to apparatus, chemicals, and processes, Mr. Woodbury, of Manchester, who has had great experience as a professional photographer in India (and whose beautiful negatives prove that he has mastered the difficulties attending the practice of the art here), will be able to give you the best information. I will, however, mention what I have generally found to work satisfactorily.

I have tried collodion from almost all the celebrated makers, and have found none superior to Thomas's, which works satisfactorily and keeps well. Iodizing solutions appear to undergo some change by keeping, and I frequently use an iodizer made here with collodion received from England. Collodion recently made is, however, to be preferred,

*Continued from p. 485.

and I mix small quantities at a time, sufficient for two or three months' work. Pyroxyline should be kept in a muslin bag, and may be hung up in the operating room. If kept in stoppered bottles, an atmosphere of red fumes is often formed, and the decomposition is soon completed. When the red fumes begin to appear, the cotton should be well washed and dried again, and it may thus be saved from further decomposition. Ether and alcohol are best sent out in the hermetically sealed round glass flasks, made by Negretti and Zambra. These flasks contain three or four ounces each, and, being closed with a blow-pipe, they are perfectly air-tight, and will bear any amount of knocking about. I use collodion with a large proportion of alcohol, which will be found the best for coating large plates. The collodion is composed of ether 10 ounces, alcohol 5 ounces, pyroxyline 100 grains, of which three parts are added to one part of the iodizer made of iodide of potassium 40 grains, iodide of cadmium 60 grains, bromide of cadmium 10 grains, and alcohol 5 ounces. As a general rule, when a formula is giving satisfactory results, it should be adhered to. Much loss of time and material is often caused by needlessly changing processes. The collodion should not be iodized too long before using, as free iodine is soon liberated, causing a great loss of sensitiveness, and producing nitric acid in the silver bath. The collodion bottle should be graduated, so that no glass measure need be used in mixing the collodion. To protect the bottle from the light, it may easily be varnished over with the ordinary black varnish, used for backing positives.

The bath is made from the best nitrate of silver, according to Hardwich's directions, but I generally use 40 grains to the ounce of water. For developer, the ordinary protosulphate of iron, 15 grains to the ounce, with 20 minims of acetic acid, will be found suitable for ordinary work. No alcohol need be used in the developer. The proportion of sulphate of iron may be increased to 50 grains per ounce, when great rapidity is required. I have, for some time, been using saccharo-sulphate of iron, according to the receipt published a few months ago in the Photographic News, and find the results very satisfactory. The plate may be developed with iron till all the detail is out, and fixed with cyanide, well washed, and returned to the plate-box, leaving the intensifying with pyrogallic acid and silver to be completed on returning home. The plate should, in this case, be kept damp by placing some wet blotting-paper in the box, and rolling up the box in a damp towel. When the plate has become dry, some difficulty will be experienced in obtaining an equal deposit of silver in strengthening. When time is not an object, the picture should be finished on the spot, dried by the spirit lamp, and varnished at once. There is much less risk of injury in carrying a finished and varnished picture, as wet films are particularly liable to get damaged. Water for washing plates is generally to be found everywhere, and the tank may be filled at the nearest brook. In a forest, the bamboo yields a plentiful supply. In the stem of a young bamboo, between the joints, will be found a considerable quantity of water, pure, cool, and delicious for drinking.

A perfect varnish for India remains to be discovered. I have tried most kinds, and have never found one which gave complete satisfaction. The late Dr. Junghuhn gave me a receipt for a varnish containing shell-lac, sandarac, and elemi, which is exceedingly hard, and does not become sticky in the hottest sun. It is, however, very difficult to apply, the plate requiring to be made exceedingly hot, and for large pictures it can scarcely be recommended. Chloroform varnish is about the best, but care must be taken in printing to avoid scratches.

A Garibaldi shirt and flannel trousers will be found the best dress for a landscape photographer. The time which can be employed here for out-door work is very short; from half-past six to eight o'clock in the morning being about the extreme limits. Mr. Warner, in the article in the News of the 13th November, suggests 4 A.M. as the most suitable time, forgetting that the sun does not rise here, even on our longest day, till about half-past five, and that we have very little twilight. Mr. Breese may be able to do a little moonshine at that hour, but ordinary photographers must be content to wait till sunrise. Earlier than half-past six the shadows are long and dark, and fine negatives cannot be obtained; at half-past seven or eight, the wind almost invariably begins to blow, setting every leaf and branch in motion, and further landscape operations for the day are out of the question. The portrait lens may be fixed to the camera, and groups, &c., taken when there is too much wind for landscape work. Occasionally, after a rainy morning, or with a cloudy sky, there is a total absence of wind during the greater part of the day, and this is a golden opportunity for the photographer, who has time to take advantage of it. We, poor amateurs, who are cooped up, engaged in business in town all day, may look at the motionless trees and envy those who have leisure to profit by the favourable opportunity.

The camera, when working, should be entirely covered with one or two focussing cloths, to keep out the light and heat. Imitation leather is excellent for this purpose. The exposure is generally long, much longer, I believe, than would be required for similar views in Europe. For large views, with a long focus landscape lens and a small stop, an exposure of from one to three minutes is required. Plates 10 × 8 will be found a good size, and a triplet lens the most suitable. I have lately seen a Dallmeyer triplet, 10 × 8, which works with great rapidity, and gives so much satisfaction, that I intend to abandon the old landscape lens, and adopt a similar triplet for out-door work. The expanding body cameras are the best for India, the bellows part should be made of double leather; velvet should in all cases be avoided, as it is a great receptacle for that formidable enemy, dust. The wood-work should be strong and well made, screws being used to secure every joint and corner, as glue is not to be depended on. Walnut wood cameras seem to stand the climate well.

In sending out glass plates from Europe, they should be covered with a solution of chalk and water, or they will probably arrive totally spoiled. Collodion, iodides, silver, pyrogallic acid, in short, all chemicals for India should be put into *small* bottles. A large bottle of pyrogallic acid, once opened, soon becomes black, and perfectly worthless. Some iodides, when the bottles have been opened, become quite damp, the crystals gradually dissolve and become useless. Albumenized paper should be carefully soldered, in tins containing a quire each, which may be opened when required. Albumenized paper is very difficult to keep in any other way, becoming in a short time damp, spotted, and worthless. Chloride of gold gets through every description of cork, or stopper, and should therefore be sent out in little glass tubes, closed with a blow-pipe.

In the tent and dark-room the bottles should be plainly labelled, especially when they are similar in shape and size. Good plain tickets, for many bottles, may be cut from the advertising columns of the News.

In packing negatives for sending home, a good layer of cotton wool or calico should be placed in the bottom of the plate box, the back of each negative should be pasted over with stout brown paper, another layer of calico put on the top of the plates, and the box well closed. As an additional security, the plate box may be put in an outer case of good size, and the space between the two boxes tightly packed with paper cuttings or dry straw. Hay and sawdust are the worst possible materials for packing photographic apparatus of any kind with, and should never be used for that purpose.

I have now so long trespassed on your space and time, that I must conclude, trusting that some of your readers may profit by one or other of the foregoing remarks. Any additional information which you or your readers may require, I shall always be glad to furnish, as far as lies in my power.

Batavia, 18th July, 1864.

DR. DUCHENNE'S AUTO-PHOTOGRAPHIC PROCESS.

Dr. Duchenne, of Boulogne, has presented to the *Academie des Sciences* some specimens of his autographic process, by which he obtains photo-microscopic pictures of the nervous system. He says:—Familiarised with the difficulties of photographic manipulations, of which it is well known I have made a happy application in my electro-physiological researches upon the mechanism of human physiology, I some time ago conceived the idea of representing, by photography, some microscopic studies of the nervous system, comparing the normal state with the pathological. But I soon perceived that to attain this aim it was not sufficient to possess a certain amount of skill in photographic manipulation, and to have at command good microscopic preparations, but that the photographer must also possess the habit of working the microscope, and also be acquainted with the art of making these microscopic preparations, colouring them, and putting in proper relief those parts to which special attention must be drawn. After many attempts, which date many years back, I have succeeded in photographing with very great distinctness from microscopic preparations, the nervous elements, and the several parts of the nervous system, at several and considerable degrees of enlargement.

In April, 1864, I had the honour of communicating these first attempts to the *Academie*, in a photographic album containing thirty plates.

Unfortunately, negatives on glass, from being too tender, will not, in general, yield more than 300 or 400 proofs, and the printing of these small pictures costing at least from 15 to 20 centimes each, the publication of my photo-microscopic researches presented great difficulties.

In the desire to popularise microscopic photography, which appeared to me capable of carrying conviction to every mind of the reality of microscopic anatomy, and perhaps extend the limits of this science, I applied myself to transferring my microscopic figures, already photographed, to metallic plates or lithographic stones, by the aid of processes which would yield at least 1500 proofs.

The plates which I now present to the *Academie*, and which are intended to show, compared with the normal state, the microscopic anatomo-pathology of the spinal roots in the progressive locomotive ataxy make known the results of these first attempts.

The greater number of the figures show, when compared with the original microscopic preparations, that they are rendered with an exactitude and detail that the hand of man can with difficulty equal. If the other figures leave anything to be desired, we must only blame the negatives, which could not give a good autographic result, but which I have desired to turn to account for this anatomo-pathological study.

The price of printing each plate, composed of six figures, will not exceed six centimes; if we also consider that these figures are not changeable like those produced by photographic printing, we shall comprehend how much photo-autography, applied to microscopic works, interests the progress of science.

It would be out of place here to explain, in all their details, the various manipulations, by the aid of which I have produced my photo-autographs; but I must state that I have employed a transfer process which has some analogy with that employed in England by Colonel James. This process consists, 1st, of printing, from a negative, a positive upon bichromated gum or gelatine paper. 2nd, in covering it with a special fatty ink, which adheres only to the insoluble picture on the paper after washings, which are very delicate and require much practice. 3rd, to transfer it to a metallic plate or lithographic stone in the same manner as in ordinary autography, and, like it, penetrating into the body of the stone, without the intermedium or interposition of a foreign body (exposed bichromate), which permits of the printing of 1500 good proofs. Colonel James's transfer process is, therefore, an imitation of autography, which leads me to call it photo-autography.

In France, Captain Bau, attached to the staff of the Minister of War, has made an ingenious application of the English process to the magnificent galvano-plastic reproductions of the map of France, and to strategic plans. He has wished me to publish the delicate manipulations, which he has discovered and modified for himself, for they are not described in Colonel James's pamphlet. It is owing to the obliging kindness of this distinguished officer, that I have been able, after many attempts, to apply photo-autography to the reproduction of my photo-microscopic figures of the nervous system.

In conclusion, I give the process as modified by Captain Bau, to which I have given the preference in the execution of my photo-autographic plates.

1st. Cover the surface of a zinc plate or lithographic stone, with a thin film of bichromate of potassa mixed with sugar-candy, in the proportions necessary to give an even and polished surface.

2nd. Expose under a positive (which gives a negative picture on the stone), and thus forms a reserve of insoluble bichromate.

3rd. Wash lightly with a sponge and dissolve the picture, which then appears on the naked surface, while the whites remain covered with insoluble exposed bichromate of potassa.

4th. Apply photographic ink, which enters deeply into the bare parts of the surface, and which at the same time covers the blackened parts with exposed bichromate, then clean the surface as with an engraving.

5th. Dissolve the exposed bichromate with water acidulated in feeble proportions, which attacks the exposed bichromate after a time, at the same time respecting the lithographic ink which has penetrated the stone.

6th. Wash in a stream of water under a tap; the water carries off the bichromate of potassa, and there remains on the stone only the design in fatty ink, which has penetrated into the substance of the stone.

The plate is afterwards submitted to the usual lithographic preparation.

ÆSTHETICS OF PHOTOGRAPHY.*

Being Short Lesson in Photography.—No. 28.

From the last lesson it became apparent that landscape photography is not so easy as the young student in the heliographic art might at first imagine; and that the advanced photographer finds difficulties and defects that appear insuperable.

In some measure, the defects of flatness in a picture, or the want of a proper degree and direction of perspective in a landscape photograph, cannot be overcome; the partial removal is alone possible.

Before we enter upon the discussion of the last method of obtaining the best result under the circumstances in question, let the student be first convinced of the defect here presented. For this purpose, let a photograph be taken of an engraving, and another of any out-door scene, in both of which objects the perspective is marked in the highest degree. Observe the difference of result in the two cases. In the former, the perspective is still preserved; in the latter, in general, it is only lost but in many instances inverted, when examined with an intelligent scrutiny.

Take, for instance, by way of comparison, the photograph of Finden's engraving of the artistic production of Collins, entitled, "Happy as a King"—this photograph will be found in the second number of the *Philadelphia Photographer*. Secondly, proceed to the third, fourth, &c., numbers of this excellent journal, where will be found photographs of landscapes taken from nature.

* From *Humphrey's Journal*.

Those photographs are equally meritorious in point of photographic skill; but widely different in point of artistic skill; not that our Philadelphia friends might suppose we wish to depreciate their productions (for we esteem them highly); but it is apparent from these specimens, as it will be from the most of similar specimens, that *art* and *photography* are not always compatible, can seldom attain to the same degree of pictorial reproduction direct from nature.

Examine the photograph of the engraving in the first place.

The figures in the foreground, swinging on the gate, the gate itself, the child in the ground, the dog running and barking, and the magnificent roots and trunks of trees to the right—all these are the first and prominent parts of the picture; they are clear, distinct, the light being in the proper place in order that nature herself may be attired in her most pleasing robes and call forth the involuntary expression, "Can anything be more beautiful?" Look a little further on; what do we next behold? Another gate, another fence, other trees, another group, all properly illumined, and hence quite distinctly visible; nevertheless the distance to the objects is as apparent as if it were in reality produced by a proper application of perspective and of *artistic shading*.

Beyond this we perceive the road, that leads through two gates, meandering through the woods; the ground rises on the right and left; the trunks of the trees are so placed, so happily arranged, as if nature had stuck them in the picture for us poor mortals to run amongst; there is evident distance between each, and the shading assigns the proper direction to this distance. To the right of the wood the light could not penetrate; it is hence comparatively dark, although the parts in mass are visible enough to produce the requisite illusion of reality.

On the left, and far off, another fence, other trees, well and naturally illumined, are presented with such taste and beauty as to elicit again words of satisfaction and praise.

Is there anything unnatural, far-fetched, stretched, conglomerated, or distorted in this picture? Is there anything wanting so as to preserve the unity of idea and stimulate beauty at the same time? Nothing.

The idea is carried out.

Nature is not abused.

The perspective is correct because it resembles the phenomena of light with the given materials.

The shading is made subservient to the direction of the light and to perspective.

And by these two the distances are not distorted.

This is a work of art *simulating Nature*.

We will now turn to the photographs taken direct from nature.

The first that presents itself is a fine photograph by F. A. Wenderoth, representing scenery near Flat Rock, on the Scuylkill river. This is a fair specimen of what photography can do; the perspective appears to be in good keeping; the delineation of the masses tolerable throughout; but the shading is imperfect, which thus destroys the effects of the perspective, and renders all but the foreground flat.

The great imperfection of this photograph is the solarization of the central part of the picture, which impairs the sharpness of detail and renders those parts light and fuzzy which ought to be dark and in mass well defined. This solarization is attributable to the unequal action of the central and peripheral parts of the lens used, and the consequent disparity of effect in the negative; for if the time be sufficiently long for the central part of the picture to be good, the peripheral parts (produced by oblique pencils) will be under-exposed, and *vice versâ*.

The time of the day, too, was not the best for the pictorial reproduction of the given scene, from the fact that the sun was shining at the time (one o'clock). But of this we shall speak hereafter, our present object being to expose the defects produced by the lenses themselves.

As before observed, this photograph exhibits an average performance of landscape photography.

Without doubt, the eye might revel in the beauties of the reality, which it fails totally to descry in the picture. The eye is not satisfied because it cannot see in among the wooded distance (supposed by the perspective to exist).

The next picture is in No. 4; it represents a view of the *Delaware Water Gap*, from Table Rock, by John Moran. This photograph, as regards workmanship, is excellent. The immediate foreground again is unexceptionable; the trees, figures, and foliage are all clear and distinct. But where are the mountains talked of as towering above the clouds? They look like three pieces of hilly ground closely pastured by a flock of hungry sheep! There is no apparent distance in the so-called mountains, no definition of their character. The view itself may be a choice landscape for an artist, but the photograph of it presents no charm excepting for an artist in the delineation of foliage. It is such a one as might be taken by any photographer in almost any open field with a clump or two of trees in it, and a few contiguous hilly pastures for the background.

But the defect produced by the use of the lenses is much more visible in the photographs presented in Nos. 5 and 6. We do not mean to say by this that the artists who took these photographs were less skilled; far from it. The defect is fortuitous in some respects, and can be obviated only with much experience with the best of lenses.

The general defect of these photographs is the want of distance, or, if it exist, the distortion or perversion of it. Another defect is a perversion of light and shade by a want of correct focussing on the parts exhibited. For a part out of focus, although well illumined, would be dark in the photograph and fuzzy in definition; and a part comparatively dark, when accurately in focus, will be lighter and brighter than the adjoining parts which are better illumined, but out of focus.

Alas! what shall we do in order to present an artistic photograph of a landscape, the properties of the lens alone considered?

Answer.

For each lens there is a certain distance beyond which all objects are in focus, or so nearly so that the lens can be adjusted to that distance. This adjustment is found by obtaining a sharp definition of the moon. With this adjustment, or by lengthening the distance *slightly*, you will find the various objects in the distant landscape all equally sharp.

The greater the magnifying power, that is, the shorter the principal focal distance, the shorter will be the distance beyond which all objects are in focus with the adjustment mentioned.

Take, for example, a corrected lens of two inches focus; it will be found that all the parts of a landscape beyond 100 feet distant will be nearly equally well defined in the picture if the focus be adjusted to the most distant object.

With this knowledge of facts we proceed as follows:—

First Method.

With a lens of short focus.

If the lens will take a view of four inches in diameter, take a view of the landscape at such a distance from all objects that are to appear in the picture, as is comprehended in the adjustment above referred to. Mark on the ground-glass a circle of three inches in diameter, or of two inches and a half; see if the landscape is comprehended in this circle with an equal degree of sharpness, when the most distant object, or a very distant object, is in focus; if it is not, proceed backwards to a more distant starting point, until the desired result is obtained.

There are two points to be observed here in this mode of focussing: first, to include within the small circle only the landscape required; and, secondly, by focussing upon a very distant object, that all the parts of this central picture shall be equally sharply defined.

By this proceeding, the most distant objects will be the smallest for two reasons; first, because they subtend the least angle: and, secondly, because, being accurately in focus, the points, lines, and surfaces are not swollen and distorted. But the nearer objects, from the first fact, that they are nearer, will be larger, and from the second fact, that they are, to an infinitesimal degree, out of focus, will be to an infinitesimal degree larger than they ought to be. But this defect is in the right direction, and increases the size of the objects and their distances apart as they approach the observer—just as it ought to be and a little more.

The right conditions are evidently present in the picture by such a mode of focussing. The next thing to be looked to, is the size of the photograph, which is obtained by taking a negative from the small one by means of the expedients already enumerated in our previous lessons, that is, first taking an enlarged transparent positive with the camera, and then copying this into a negative by means of a dry plate in contact.

Second Method.

In many instances, however, using a lens of a long focus, the central part of a large negative may be sufficiently large for the purpose. This was found to be the case with the first photograph examined in the *Philadelphia Photographer;* the peripheral parts have been cut off; but there is this deviation from the rule here given, the portions in the foreground alone have been in focus, and these were too near the camera to render the rest equally sharp.

As far as the operation of a lens is concerned, we believe that the rule here adduced is the only one by means of which a photograph can be rendered *artistic*, or, as we understand it, endowed with the characteristics of a successful painting in monochrome.

But there are other defects, both in portraiture and landscape photography, besides those enumerated and dependent upon the optical properties of the lens. The defects that require our further analysis in order, first knowing them, then to remove them, and thus still grow nearer and nearer to perfection in art, are some of them the consequences of those already analysed, and others attributable to the nature of the light by which the photograph is taken, or to the want of taste in the proper selection of the object or of the proper station from which the picture is to be produced.

Finally, we beg distinctly to be understood as not criticising or desiring to criticise the photographs referred to; they are excellent specimens of their kind in every known respect, and being such and also published, they serve as examples whereby to compare properties and principles, and to demonstrate most unequivocally that *true art* loses nothing by the introduction of photography, and that photography has room for great improvement before it can make any pretensions to be regarded as true art.

It is to be hoped, however, that when *taste, experience,* and *science* are conjointly brought to bear upon the subject, the productions of the sunbeam will finally be honoured with a seat in juxtaposition with the creations of the pencil.

CARAMEL AND TANNIN PROCESS.

The following will be found an easy and very successful process. Sensitize the plate; then place it in a well bath of distilled water for five minutes, and remove it into another such bath for ten minutes—the same bath will do for many plates—flush the plate with distilled water, and then cover it with a solution of caramel (twelve drops to three ounces of water are sufficient); pour off the first quantity that covers the plate, then pour on more, off and on; then wash, and set the plate on one of its corners; in five minutes flush with water, especially the corner on which the plate rested; then cover the plate with a three-grain solution of tannin, and dry. After the plate is exposed, an exceedingly clean and soft picture is obtainable by the use of pyrogallic and acid silver. The whole process is very simple, easy, and certain. Two plates I intensified with bichloride of mercury; they were far from being failures: but would Col. Wortley, who intensifies with bichloride of mercury (Photographic News, p. 76, 1863), or any other contributor, give particulars of the *modus operandi,* and the *time?* I used iodide of potassium, but I find Col. Wortley uses a five-grain solution of iodide of ammonium, after washing off the bichloride of mercury. No doubt this is to be preferred, but I have not yet tried it.

Since the above was written, there has been printed an albumen-tannin process by Mr. F. Glover. He washes the plate, after sensitizing it, in two changes of water, then places it for five minutes in ten grains to the ounce of water solution of bromide of cadmium, then puts it to soak in water, and then applies a fifteen-grain solution of tannin with albumen (three ounces of water and one egg) with eight drops of ammonia, then places it in the water in which the bromized plate was washed. If a caramel solution were used with a weaker solution of tannin than that mentioned, there can be little doubt of equal success, though the ammonia used with the albumen may have some good effect. T. F.

ACTION OF LIGHT ON SANTONINE.—PHOTOSANTONIC ACID.

BY M. SESTINI.*

Santonine, it is well known, is coloured yellow by exposure to solar light, and this takes place in a vacuum, as well as in the air. It does not take place, however, when the actinic rays are cut off by means of a solution of nitrate of uranium.

Crystals of santonine reduced to powder, and then exposed to light, not only change colour, but evolve a resinous odour, and acquire a very bitter taste. Water added to this changed santonine acquires a yellow colour, presents an acid reaction, and has a bitter taste. On distillation the same water yields an acid liquid which reduces nitrate of silver and bichloride of mercury, and precipitates acetate of lead white. The author concluded that the volatile matter formed during the colouration of santonine by light was formic acid. On evaporation to dryness the distillate gives a deep red-coloured resinous residue.

By treatment with water the coloured santonine almost entirely lost its odour. On treatment with alcohol it now in great part dissolved, giving a yellowish solution, which, on evaporation, left a reddish-yellow residue, the greater part of which was soluble in ether. The etherial solution left an uncrystallisable residue of an amber colour, and with a very bitter taste.

In subsequent experiments made by exposing santonine to light under water, from which all air had been carefully expelled, the author obtained exactly the same results, and hence concluded that by exposure to solar light santonine is changed into formic acid, and an uncrystallisable substance much more soluble in alcohol and ether than santonine itself, and also a red resinous substance. To the yellow uncrystallisable substance he has given provisionally the name *photo-santonic acid.*

The acid, on analysis, gave results which agree very nearly with the formula $C_{11}H_{14}O_3$. Its chemical properties will be described in a future memoir.

CAMERAS WITH CONJUGATE FOCI.

All cameras are constructed on the principle of conjugate foci: yet we designate specially by the denomination *cameras with conjugate foci* those by means of which we obtain proofs from a negative, without there being contact between this latter and the surface to be printed. This kind of camera includes the two foci within itself, while, in the employment of ordinary cameras, one of the two conjugate foci is found outside the apparatus. The camera with conjugate foci differs in its construction from

* *Chemical News.*

the ordinary camera, inasmuch as it is furnished with two drawings and two frames: one of the frames receives the negative, the other the sensitized plate. The objective is fixed in a slide placed between the two frames. After focussing, the respective positions of the negative and the ground glass are those of the conjugate foci. From the relation that exists between the distances of each of these foci to the objective depends the size of the proof. This kind of camera, in the hands of an ingenious photographer, is susceptible of many interesting applications: it serves to some extent for enlarging and for reductions; it supplies the means of making microscopic transparent pictures, and transparent stereoscopic slides, for the magic lanthorn, &c.

Amateurs who possess two ordinary cameras can very easily supply the place of the camera with conjugate foci by the following arrangement: the two cameras are placed opposite to each other on a level board; the first camera only is furnished with an objective, the front of which must be at a few centimetres from the circular opening of the second camera. To prevent the lateral rays from interfering, the space between the two cameras is covered with a black cloth. One end of this cloth remains loose, while the other is fastened to the bottom of the rack-work screw of the objective.

It will be found convenient for the whole arrangement to be placed upon a stand, the table of which can be so inclined that the apparatus may be pointed to the sky. When we wish to obtain a proof larger than the negative the objective must be turned.

In future articles we propose to describe in succession the different applications of the camera with conjugate foci.—*Bulletin Belge de la Photographie.*

Correspondence.

PHOTOGRAPHIC REPRODUCTION OF PAINTINGS AND ENGRAVINGS.

Sir,—Your leader in No. 313, on the reproduction by photography of the works of art in the various galleries in this country, opens a very wide question, and I will venture a few remarks thereon, which you may deem of interest. Instancing what has been done on the continent, you refer to the productions of Herr Schauer and Mr. Bingham especially; and the few I have seen of them fully justify your eulogiums. In Herr Schauer's practice, you say they are reproduced from as good engravings of the pictures as can be obtained. Now, consider what abundant materials he has at his command, and does he not prefer the prints to the pictures, engraved as they are principally by the finest talent in the world? But on the other hand, how many engravings exist of the many fine pictures in this country by either English or foreign artists? Why, few or none.

Three engravings from pictures by Murillo, of the "Conception of the Virgin," the "Salvator Mundi," by Leonardo da Vinci, in the National Gallery, have been engraved by foreigners. Mr. George Doo has engraved Correggio's "Ecce Homo" and an infant Saviour, also a Virgin and Child some years ago, which, although full of admirable work, have, I believe, met with but moderate success. I take as a test the present market prices they will fetch at a public sale, compared with the works of Morghen, Muller, and Desnoyers, or the more recent engravings of Forster, Felsing, and others. Mr. Doo is also now engaged, under the auspices of a committee of noblemen and gentlemen, seeking to encourage that class of art. An engraving, "The Raising of Lazarus," by Sebastian del Piombo, a fine picture, but said to have been worked upon to its disadvantage by Benjamin West, and already known by an engraving by Vendramini, which is but little esteemed. Murillo's "Flower Girl," at Dulwich, was also most beautifully engraved by J. H. Robinson, some five and twenty years ago; some pictures in the National Gallery were engraved by the Associated Engravers, under the management of Mr. John Pye; the success in this instance was not encouraging. Raphael's Cartoons have also been engraved by Holloway, but not equal to those by Dorigny, as truthful copies of those celebrated works. So that looking to that source for assistance to the photographer, it exists but in a very limited degree, and the more numerous engravings, known as the Stafford, Houghton, and other galleries, would be of little use in fine works in photography.

Well, then, you go back to our older engravers, you find that Strange was the man whose works from the old masters are the most numerous, and possess marvellous rendering of colour, but are confessedly deficient in drawing; still, from their general excellence and number, maintain a high value as a collection, but as separate prints, those of Charles I., after Vandyke, and Titian's Venus and Danae, are the ones principally sought after. Sharp also engraved many fine works of the same class, "The Dead Christ," at Castle Howard, among others; but the engraving by Rouillet is much finer, Bartolozzi engraved a few also. Earlom and V. Green added to the list, but their works would, I apprehend, offer little inducement to the photographer to copy. As a modern work, I may instance Mr. Samuel Cousin's engraving of Guido's "Cenci," but I think few would prefer that print to the fine engraving by Garavaglia, and the reference to this picture brings me to a photograph of the original by Mr. Lake Price.

Now, whatever value may be attached to having an exact copy of a picture, I cannot conceive that anyone would prefer the photograph to either of the above engraving. Here you have an accomplished artist, both with his pencil and his camera, who has essayed the task you point yet out; can it be said that he has succeeded in rendering this picture satisfactory, or does the original present peculiar difficulties? I think not, and I venture to express an opinion that without other assistance, such as working up a photograph in monochrome *from* the original, and that, too, by a *very clever man*, another difficulty to get over, by the bye, but which could be easier supplied from the continental schools than in this country, and recopying photography will not give you satisfactorily the colour and peculiar characteristics of the old masters. Looking, then, at the probable outlay required for all that, will you find sufficient encouragement in this country to enter into such a heavy speculation? Now, on the continent a different feeling exists, and I do not advance it in disparagement of the English school of engraving, but I think I may say that the foreign engraver, be he French, Italian, or German, seems to possess a speciality for that class of picture, and it meets the taste more there than it does in this country, at least, as far as the productions of the English school are concerned in that particular branch; and with all deference to Mr. Tom. Taylor's opinion as to photography and engraving, I will maintain that without the aid of the artist; as I point out, I do not believe that photography by itself can ever give you a fine and satisfactory copy of an old master, especially when it has acquired that low tone which is so much valued, and the removal of which from many of the pictures in our National Gallery a few years ago was so much censured; and most probably the photograph which elicited Mr. Tom Taylors's criticism, was produced from a print, thereby having all the advantage of black and white to be mechanically rendered.

There may be some truth in the assertion in the *Athenæum*, as to photography driving out line engraving, but I am inclined to think the non-production of such works arises in a great measure from the fact, that engravers who could engrave them are very limited in this country, and from the time occupied in producing such engravings, and the uncertainty publishers have of seeing a return for their outlay. I could point out many instances where engravings have been in hand, five, ten, fifteen, ay twenty years, and no interest paid for the money laying idle so long; therefore can you be surprised if the photographer obtains little assistance from the print publisher, when he has such expenses to contend with, and has to wait a slow sale for getting his money back again?

With regard to the modern school of painting, there are other difficulties to be overcome, and, although Millais, Sant, and Noel Paton may have painted pictures for reproduction by photography, I do not recall them to my mind, though, will the photographer enter into competition with the print publisher and pay the enormous copyrights demanded for these gentlemen's best pictures, or will the artists themselves forego the legitimate reward for their labours, knowing, as they do, the immense return obtained by many such speculations? That their works have been photographed is true enough, and they have sold well; but, as the police courts have shown, it has been done by copying the published prints of their works, and invading the publisher's rights, and the recent Act of Parliament has been called for by both photographer and print publisher, to protect them against unscrupulous men, who cared not who paid the heavy expenses shown to be incurred in the modern publishing trade. Why, when Mr. Ceilcur's remnant

of his stock in trade was sold off a few months ago, at Camden Town, his walls were covered with beautiful photographic copies of Landseer, Sant, and others, *all* infringements of copyright, and three copies of Millais' engraved pictures were catalogued for sale a few weeks ago at Steven's Rooms. Another difficulty also exists, although not to so great an extent as formerly, that is, the too great dependence upon colour, and lack of thorough drawing in many esteemed works of the English school; and although fine engravings exist of those same works, they are very frequently indebted to careful and skilful touching on the engraver's proofs, when the painters have seen their labours transferred to black and white. This is borne out by the many prints which have found their way to the sale room from deceased engravers' portfolios, and which possess much interest, as showing how much they may, in many instances, correct their original ideas, and I think I can confidently assert that with the engravings from Turner's pictures, published since his death or without his supervision, there is an unquestionable lack of that excellence and beauty which his works generally possess.

I know of one instance where an eminent line engraver sought to get a photograph of a large picture he was engaged upon: it was painted by a talented modern artist, whose engraved works are well known, and placed in the hands of a very skilful photographer, who charged five pounds for copying it, but the result was utterly valueless; but had he had the print to copy, he would, undoubtedly, have succeeded in producing as effective a photograph as the print is satisfactory; not but what it taxed the engraver's skill to balance in black and white the bright and glowing colours of the canvas.

The French school of painting, although in some instances objectionable in colouring to English taste, is characterized by generally better drawing, and painted on principles which are nearer to monochrome than may at first sight be apparent, and as much as they translate into good and effective prints, so they are reproduced by photography better than the majority of English pictures can be.

There then remains this difficulty with both ancient and modern art: will the moderate price at which the public at the present day expect to get photographs, pay for an undertaking of such magnitude as you urge upon the photographic world? That it would be gratifying to see it done is one thing, who is to pay for it is another. If you have fine prints to copy from, the expenses may be moderate; but if you must, and are willing to encounter the difficulties I have pointed out, and which I do not believe to be overstated, then you will require a very long purse, and great determination to overcome even those, and you would find many others the further you advance, and it would resolve itself into a simple question at the last: "Will it pay?"—I remain, sir, your obedient servant, J. S. W.

Photographic Notes and Queries.

Old Negative Baths for Printing.

Sir,—Having seen it recommended in a late number of the News, to use old negative baths for printing purposes, I proceeded according to Mr. Gago's formula for preparing pure nitrate from old baths, given in the Year-Book. After bringing the resulting solution up to 60 grains to the ounce, by the addition of fresh nitrate, I tried a few pieces of paper with it. The print before toning looked in all respects as good as others sensitized on a usual 60-grain bath, but the effect of the toning bath was to produce a reddish colour, as you will see by the enclosed. Will you kindly inform me if my proceedings were correct, and, if so, why in your opinion I have failed to produce a good tone?—I am, sir, yours respectfully, L. H. W.

2, *Vernon St., Hull, Oct. 7th*, 1864.

[The tone of the print enclosed is one which we decidedly admire; but it is probable that by neutralizing any free acid in the bath by the addition of a little ammonia, or by fuming the paper, you would more readily obtain a blacker tone.—Ed.]

Manufacture of Chloride of Gold.

Sir,—Will you allow me a small space in your invaluable journal to make a few remarks in reference to a letter from Messrs. Johnson and Son, in your impression of the 7th October.

I would remark that the contents of their letter reads exceedingly like *advertising* at the expense of the proprietors of the News. Messrs. Johnson and Son state that the process given by Mr. Eliot, for the manufacture of chloride of gold, differs from *their* manufacture of it. Probably that may be so, and yet not be superior. But Messrs. Johnson and Son do not appear to have photographic interest so much at heart, as to describe *their* process. If Messrs. Johnson and Son are the largest manufacturers of chloride of gold, I would ask if any of the immense quantity of trash sold for the above article comes from their establishment.

I think photographers generally ought to be greatly obliged to Mr. Eliot for his liberality in describing his process, and before gentlemen try to disparage any process freely given for the benefit of the public, they ought to be prepared to offer a better.—I am, sir, yours respectfully,

A Young Photographer.

[We hope that Messrs. Johnson and Son will be a little more explicit in their statement as to the impurity left in chloride of gold manufactured by Mr. Eliot's method. We are not willing to believe that a respectable house address the readers of a scientific journal in such a manner, simply for the purpose of gaining an indirect advertisement. The real question is, does the chloride of gold manufactured by Mr. Eliot's method effect the important end he describes of toning satisfactorily, in an economical manner? We have the best reason to suppose that it does. At the same time, we know there are many samples of pure chloride of gold in the market.—Ed.]

The Wothlytype Process.

Sir,—Since the account of Mr. Wothly's process appeared in the *Times*, and while waiting till it is made generally known, I have been trying some experiments in that direction, with more success than I expected. I certainly do not find that any *salt of uranium*, when *alone*, and dissolved in collodion, gives good results. As far as my experience goes, there must be present a salt of some other metal, as silver or gold, in addition to the uranium; and the reducing powers of the latter then act most energetically. I have found three parts of nitrate of uranium and one part nitrate of silver, when dissolved in collodion, give a very good paper, printing quickly, and giving a very agreeable sepia tone, without any after toning. The acid solution, which is to remove the unchanged salts, is, I presume, the oxalic. I was led to suppose this, as that acid does dissolve unoxidized nitrate of uranium, and I found it fix the picture perfectly, as I suppose it forms an oxalate with the unoxidized silver present.—Believe me, dear sir, very truly yours,

British Legation, Turin, Oct. 8th. N. Jocelyn.

[A double salt of uranium is employed in the new printing process: but we are not in a position to indicate its nature at present. It is probable that salts of gold, silver, or iron, may be used with advantage, in conjunction with the nitrate of uranium. It is probable that the acid bath contains either citric, oxalic, or tartaric acid.—Ed.]

Talk in the Studio.

Art Reproductions by Photography.—In Paris the Superintendent of Fine Arts has authorised the reproduction, by means of photography, of the sculpture, both ancient and modern, in the Museum of the Louvre.

Photography and Line Engraving.—The art of the photographer is tending to supersede that of the engraver in France. At the recent competition for the grand prize of Rome, the specimens submitted to the jury were so inferior that no prize was awarded, and the fact is but too evident, that in consequence of the comparative cheapness of photography, or from that and other causes combined, the burin has become almost a neglected instrument. This is certainly greatly to be lamented, and the artist world of France has taken the alarm. There is in the Louvre a department of Chalcographie, for the express purpose of encouraging engraving, but it has not sufficient funds for the purpose, and perhaps the very nature of a governmental establishment is against it. One complaint made against it is, that sufficient encouragement is not afforded to native art. In these circumstances the city authorities of Paris have taken up the matter, and are about to try and raise up the engraver by giving him some important commissions.

A Colossal Statue, said to be the original "Satyr" by Praxiteles, has recently been found in Rome.

Laying the Foundation Stone of a Photographic Studio.—Mr. Jabez Hughes has recently laid the foundation stone of large and handsomely designed premises in Ryde, Isle of Wight, for the purposes of a new photographic establishment and studio. Under the first stone were deposited, in addition to the current coins of the realm, a copy of the *Times* newspaper, and as examples of the current photographic literature, copies of the Photographic News, the *British Journal*, and the Society's *Journal*; to these were also added the photographs of the Queen and Royal Family, recently taken by Mr. Hughes, together with photographs of himself and family, and of the old premises pulled down to make way for the present building. Mr. Hughes facetiously remarks, that if at any after time the pictures be found to have faded, they will certainly be found well *fixed*.

The New Dry Process.—Mr. Sayee informs us that the new dry process without nitrate bath continues to work well, and that the collodion containing the bromide of silver keeps well.

Another Suicide with Cyanide of Potassium.—A coroner's inquest took place on Saturday, in the dining-room at No. 1, Richmond Terrace, Hackney, before Mr. Humphreys, on the body of Mr. William James Groves, aged 42 years, who poisoned himself on Thursday last with cyanide of potassium. The medical evidence established that the deceased had been poisoned with cyanide of potassium, and the surgeon remarked upon the terrible facility with which it could be obtained, because it was used in the arts. The jury found:—"That the deceased, committed suicide by poisoning himself with cyanide of potassium while in a state of unsound mind, and the jury desire to draw attention to the danger of permitting the indiscriminate sale of cyanide of potassium to unknown persons, and to suggest that in all cases the purpose to which so deadly a drug is to be applied should be carefully ascertained."

To Correspondents.

*** Several advertisements are compelled, from pressure on our space, to be omitted this week.

Lost Diaphragms.—Mr. Sayee, of Liverpool, informs us that he recently found, at Llangollen, a case of diaphragms belonging to one of Dallmeyer's lenses, which had been evidently lost by some tourist visiting the Abbey. He will be happy to return it to the owner, on application.

C. B. P.—The turbidity in your newly made bath might proceed from impurity in the distilled water, or it might be from adding excess of iodide. In either case, adding nitric acid was not the remedy. Neutralize it, if it be acid, by adding a few drops of a 10-grain solution of carbonate of soda, and then expose it for some hours to bright sunlight, until all turbidity has disappeared by precipitation. Then filter, add a trace of nitric acid, and you will probably find it work all right. 2. The negative which is too thin after the use of mercury and iodide of potassium, may be further intensified with pyro and silver. 3. The portrait is under-exposed; and you use too much top light, which causes the black shadows under the chin, &c.

J. J. There are several modes of printing upon ivory; but all require some little skill and practice to ensure success. You will find an article giving full instructions on the subject, by Mr. Samuel Fry, on page 171, vol. v., of the Photographic News.

Albumeno.—Whether the Wothlytype process of printing will come into general use or not, or how soon it will do so, we cannot say at present. If the hopes at present entertained be verified, it will, in all probability, come into general use, and if so, it will doubtless supersede the necessity for albumenized paper.

H. Nutt.—The exposure of your picture has not been effected with sufficient rapidity to give an instantaneous picture. Merely uncovering and covering with the cap in hand requires very great practice indeed to do it sufficiently rapid. An instantaneous shutter is generally needed, and that requires skilful management to secure an instantaneous exposure. Your picture is a little over-exposed, and there is, both in waves and vessels, sufficient movement to spoil the sharpness and render the picture useless for commercial purposes.

A Young Photographer.—Cover five feet of your glass roof, over the head of the sitter, with a black blind; and have over the remaining portion of the roof a white blind, which can be withdrawn wholly or partially at pleasure. Have white blinds at each side to be dealt with in the same way, and then make yourself familiar with the effect of each blind by following our suggestions in a recent article on "Experiments in Lighting." 2. The spots in your negative, produced under the circumstances you describe, are probably due to dust. We could have formed a better opinion of this and also of your lighting troubles, if you had sent us specimens of the defects to be remedied.

E. W. P.—Platinum is used for toning in the same manner as gold; but it is generally found to produce better results in combination with gold than alone. 2. The enamelling process is intended for use with albumenized paper prints or plain paper prints, either. The minute air bubbles which arise, are the result of imperfect manipulation. The process requires a little skill, to be obtained by practice, to perform it neatly. If the print be wet, and be laid down in the manner described by Mr. Tunny, and pressure applied skilfully, there will be no air bubbles.

D. Griffith.—You would see a paragraph in our last referring to M. Crozat's circular.

A Beginner.—The stains on your background might arise from two or three causes. From dirty plates, from scum on the surface of the bath, from accumulated drainings of the free nitrate on the plate, or from the developer not covering the plate perfectly at one sweep. All these are points belonging to good manipulation, and upon which you should take care not to err. You have a little too much direct front light, and you intensify too much.

G. D.—You will find designs and directions for the erection of a glass-room in our last Year-Book.

J. Curtis.—As a general principle, the place of the stop is best where it is fixed by the maker of the lens. The size of the picture which a lens will produce depends upon the focal length of the lens, and without knowing this we can give you no idea of the largest size your lens will produce. Who is the maker of the lens? It is difficult to say to what extent a picture may be enlarged, without the fact that it is an enlargement being apparent. Much depends upon the skill with which it is managed. We have not the address of the gentleman in question.

A Subscriber from the First.—You might with propriety extend the side light on both sides, but you may first try the effect of adding the 2½ feet on the north side. We do not think that you need alter the position of the house. One cause of the want of light about the feet is the lens, which is not equal to the work. You require a lens of longer focus than that with which you are working. Take your figures a little smaller, and secure a little more shadow on one side.

A Constant Subscriber has not been a constant and careful reader, or he would have known that we never recommend the addition of acetic acid to a bath for wet collodion negatives. Once in the bath, it is very difficult, if not impossible, to remove, and it is a frequent source of trouble. It is probable that the bath contains acetate of silver and organic matter; a bath in this state often gives very insensitive plates, requiring a good exposure and bright light to obtain a negative at all, and with a dull light and short exposure yielding nothing but stains and fog. This would account for the different behaviour of the same bath when used for out-door photography, and in the studio. Read the article in our Year-Book on dealing with disordered baths. 2. We are sorry that we cannot help you about the rolling press. If it were out of order to begin with, it was sure to get worse, and if the bearing were unequal, it is very likely that the teeth of cast iron cog-wheels would break. 3. A printing bath by use acquires from the salt in the paper various nitrates, such as the nitrate of soda and of ammonia, &c., besides other matter. This prevents the ordinary argentometer from giving an accurate register of the real amount of silver in the bath. Read Mr. Blanchard's article on commercial printing, in our Year-Book, as to the best mode of keeping up the strength of a bath.

Excelsior.—A bath like that you describe, made with chloride of gold and carbonate of soda, will tone very rapidly, if used just at the right moment after it is made; but it is apt to tone too energetically, and produce an inky print like that enclosed, and in the course of a few hours, or next day, it will be found that it will not tone at all. The portrait is under-exposed, and you have a little too much top light. The darkness of the print is rather due to under-exposure in the negative, than to over-printing.

T. C. B.—We have given various articles on the construction of glass-rooms, but perhaps the most useful information for your purpose will be found in an article with illustrations in our last Year-Book; this will give you many useful hints in erecting a glass-room. 2. The manual to which you refer is not on the subject of photography, but of colouring. Mr. Hughes' Manual, and "Practical Photography," published by Negretti and Zambra, are trustworthy books for beginners.

Novice.—The reticulation of the collodion film may be partially due to the character of the pyroxyline, but it most probably arises from the spirits employed as solvents being too weak; in other words, containing too much water. If the film be allowed to set well before immersing it in the nitrate bath, the tendency to craping will be lessened.

E. R. W. B.—There are various modes of removing the red colour from decomposed collodion, but it does not necessarily follow that removing the colour will restore its sensitiveness; nor does it necessarily follow that having the red colour will cause it to give bad pictures. Placing a little silver foil in the bottle, or agitating the collodion with a little carbonate of soda, will, however, probably remove the red colour. The addition of a bromide will probably do most to restore the sensitiveness. 2. It is difficult to give a formula for a good negative collodion in a few lines, but try the following:—Pure ether and alcohol equal parts; to an ounce of these add 5 grains of pyroxyline, 2 grains of iodide of ammonia, 2½ grains of iodide of cadmum, and one grain of bromide of ammonium. You will find full details of manufacture in our Year-Book.

T. F. Usk.—We are obliged by your communication.

Sensitizer.—The fault is in the albumenized paper. The cause of the fault we do not know, but have received many examples of it lately.

Several articles are compelled to stand over. Several correspondents in our next.

Photographs Registered during the Past Week.

Mr. Joseph Collings, 47, Bute Street, Cardiff,
Photograph of "Penarth Head Inn," Penarth, Glamorganshire.

Mr. James Andrews, 90A, High Street, Ramsgate,
Three Photographs of Thomas Scott, Esq.

Messrs. Lambert, Weston & Son, 17, Waterloo Crescent, Dover,
Photographic Group, H.R.H. The Duke of Cambridge, General Dalzel, General Elliee, and their respective Staffs.

Mr. Peter Hopwood, Bridgnorth, Salop,
Photograph of Lady Forester (of Wilby Hall, Salop), in Phaeton.

Mr. James Whitlock, Birmingham,
Four Portraits.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to Thomas Piper, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

THE PHOTOGRAPHIC NEWS.

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THE NEW URANIUM PRINTS.—EXPERIMENTAL TESTS FOR PERMANENCY.

WE have just had an opportunity of applying some tests, in order to ascertain the probable permanency of the prints produced by the recently perfected Wothlytype printing process, which have afforded us much satisfaction, and a record of which will doubtless interest our readers.

The question of permanency or stability in the productions of any process which challenges the attention of the photographic world, as a substitute for the system of printing at present in universal practice, is one of vital importance to photographers. That the process of silver printing can be conducted, so as to yield stable prints, is tolerably certain; but that a large proportion of its products change, fade, and become worthless, is equally certain, Any process, therefore, equally cheap, simple, and beautiful in result, for which, at the same time, greater permanency is claimed, is sure to obtain general attention. The results of the new process are, in all respects, at least equally as beautiful as silver prints; the manipulation is more simple: the cost will probably be less; and greater permanency is promised. These are qualities sufficiently attractive to demand for the process the fullest examination and the fairest trial.

Nevertheless, the question of permanency must be fully discussed. The grounds of the assumed superiority over silver printing in this respect must be fully examined. The permanancy of uranium prints has years ago been questioned. Prints taken by Herr Wothly, a year or two ago, are known to have faded. The exact nature of the salt used in the process, remains a secret. These, and other considerations, render it imperative that satisfactory tests should be made of the permanency before it is taken for granted. We are only concerned to elicit the truth, and not to make a case, either for or against the new process. Our duty is to the great body of photographers: if we lead them to believe that the pictures are permanent, which are afterwards found to fade, we do the art and its votaries a great wrong. If on the other hand, we cast doubt upon the stability of prints, which it may be are quite permanent, we do still a wrong in retarding the consummation of a vast step in the art. We gladly availed ourselves, therefore, of an opportunity offered by Col. Stuart Wortley, to conduct, in his presence, some experiments for testing the stability of the prints produced by Herr Wothly's process.

Perhaps there is but one method of testing the absolute permanency of any print; and that is, examining it periodically, as it is submitted to the action of time. That is a test as hopeless as the experiment of the boy referred to in the *Times* article on the subject, who having heard that the raven lived a hundred years, procured one in order to see for himself. Fortunately, however, in experiments of this kind, the effect of time, or rather of the agencies which act during the progress of time, can be to some extent anticipated. Knowing the agencies, which, in a dilute state, act slowly, and only produce definite results in months or years, we can apply them in a concentrated form, and so produce the results in minutes, hours, or days.

It is perhaps necessary to premise that there is an essential difference between stability or permanency in such things and indestructibility. A print may be quite permanent in all the conditions in which it is proper to keep it, without being invulnerable to destructive agencies, with which it has no business to come into contact. One of the gentlemen who, some years ago, denounced the permanency of uranium prints, alleged that they did not resist the action of boiling cyanide of potassium, of nitro-hydrochloric acid, &c. These solutions actually dissolve metallic gold, the least changeable of metals; is it to be expected, then, that any print formed by the reduction of a metallic salt should resist their action? Caustic potash will destroy a carbon print or an engraving, and the fire will burn still more durable pictures; but because a print is destructible, it by no means follows that it is wanting in permanency.

Regarding the specimens of Herr Wothly's printing, which have faded, it is only right to state that the process just patented is alleged to be a new one, only discovered a few months ago, whilst the prints which have faded were taken by another process upwards of twelve months ago.

In anticipating the effect of time on the permanency of such prints, it is necessary to enquire what are the most active injurious agencies commonly found in the atmosphere of towns. Light, air, and moisture alone will produce change in some prints, and to test the effect of these ourselves, the lapse of a few weeks will be desirable; in the meantime, we have testimony that the prints have been already very severely tested in this respect, without any sign of change. The effects of foul air, or of common impurities in the atmosphere, such as sulphur, sulphuretted hydrogen, chlorine, &c., which act injuriously on silver prints, may much more readily be ascertained, and to the examination of the effect of some of these, we addressed ourselves. Uranium is described as a metal which resists the oxidizing effects of air and water, and which readily combines with chlorine and sulphur. Our experiments it will be seen, therefore, not only anticipate the action of an impure atmosphere, but readily meet the special characteristics of the metal principally employed in the process. It is probable, however, that the finished picture consists chiefly of gold.

To test the action of chlorine, Col. Stuart Wortley, at our suggestion, had made the night before a strong solution of chloride of lime, and placed in it a finished silver print, and a finished Wothlytype print. These had been soaking all night, therefore, when we examined them. Of the silver print nothing remained but a piece of slightly discoloured paper. The uranium print was bleached, and somewhat

impoverished generally, but the image was not destroyed or obliterated. We next examined a uranium print, which had been immersed in strong ammonia for a few days, at the suggestion of a contemporary; this, as we should have anticipated, was not changed. We now applied a test which we have never found an albumenized paper print to withstand without change, we refer to hydrosulphate of ammonia. The action of this solution on silver prints in most respects resembles that of sulphuretted hydrogen. Applied in a concentrated form to a silver print, it at once produces a yellow discolouration, even in the whites, where, theoretically, nothing but paper without silver ought to be found. Applied in a very dilute solution, the print under its action gradually assumes all the changes in appearance of a fading print: the whites become yellow and dingy, the half tones gradually disappear, the blacks assume an unwholesome greenish brown tint, and the print is spoiled. We watched its action on the uranium print, therefore, with considerable interest.

In order to make the tests satisfactory, we applied them simultaneously to a well-washed silver print, and to a uranium print, which had received less than ordinary care in washing, &c. This is scarcely fair to the uranium print; but as Col. Stuart Wortley was desirous of watching the result on a print carelessly treated, rather than one which had received especial attention, and was willing to risk the result, we had no objection. On applying the hydrosulphate of ammonia to the silver print, by merely touching it with the solution, it was discoloured in each place touched, in a few seconds. The same solution applied in the same way to the uranium print, produced no change whatever, either in the whites or blacks. A piece of each print was then treated with larger proportion of the solution, and left to soak for a while. The silver print was hopelessly destroyed in a few minutes, whilst the uranium print remained quite unchanged after the lapse of twenty minutes, as long, in fact, as we continued the application. This experiment was a satisfactory one in two respects, as it not only afforded the strongest assurance of permanency in the presence of an agent destructive to silver prints, but it satisfied us of the absence, in the print submitted to this treatment, of any trace of silver, which one of our Continental *confrères* thought he discovered by analysis in one of Herr Wothly's prints. Col. Stuart Wortley also showed us a print which had been confined for some hours in a box with burning sulphur, which had produced no change whatever. As the print resisted the action of a sulphide, we were not surprised that it should resist the fumes of sulphur itself.

We next applied some tests, partaking more of the destructive character. Sulphuric acid was poured on the surface of a uranium print, and on a silver print. The latter was destroyed at once, but the uranium print, on being sponged, after a few seconds, was found uninjured. On applying the sulphuric acid for a few minutes, however, the image was attacked; but after sponging and examining the print, we found that the result was less change than destruction; the collodion surface was entirely removed, and the image remained in the paper, faint, but not discoloured. The action of nitric acid was similar, destroying the image at once in the silver print, but more slowly reducing the depth, and finally destroying the uranium image. A strong solution of cyanide of potassium was next tried; this very quickly obliterated the silver image, but more slowly acted on the uranium print, gradually reducing it in depth, but not, in the course of half an hour, entirely obliterating it.

The result of these experiments is most favourable to the claims of the uranium prints; and we may, without hesitation, affirm our conviction that they resist the most common causes of change in photographs much better than silver prints. It may be too much to assert as yet that they are absolutely permanent. There are still some corroborative experiments we intend to make, such as testing their power to resist oxidation, by watching the action of a permanganate solution; submitting a print for some time to the action of air and moisture in the light and in the dark, unmounted and mounted, so as to be in contact with a readily decomposable organic substance. In the meantime we may express our conviction that a strong *primâ facæ* case is presented for entire permanency, and certainly for a greater amount of stability than is at present possessed by silver prints.

PHOTO-SCULPTURE IN ENGLAND.

We availed ourselves, a few days ago, of the courteous invitation of M. Claudet to visit his studio, to inspect the arrangements he has made for carrying out this novel and beautiful application of photography in this country, a few details in regard to which may be interesting to our readers.

In the studio of M. Willeme, the inventor of this system of photo-sculpture, as we have more than once described, arrangements are made for obtaining the twenty-four portraits, required for the sculptor, at the same moment; twenty-four distinct cameras and lenses being ranged round the sitter, so as to get as many distinct views on as many different plates. This system, although possessing some advantages, also possesses decided evils. A large circular glass-room is required, and such an arrangement of light all round the figure as shall illuminate every portion of the model equally. This, whilst desirable for securing the negative perfectly, is utterly destructive of effect and vigour in the pictures, and is often equally injurious to the negatives, for each camera is necessarily exposed to the fogging influence of direct light, coming from the window to which it is opposite, and entering the lens. Thus it will be seen that the circular glass-room and twenty-four cameras, whilst possessing some advantages, is not without serious drawbacks.

M. Claudet conceived that a plan which should render available a studio arranged expressly for photographic portraiture, combining the conditions for satisfactory lighting, comfort for the sitter, and freedom from photographic difficulties, such as diffused light entering the lens, &c., would materially aid in securing, in the finished sculpture, artistic effect and satisfactory portraiture. He has, therefore, devoted a portion of his studio in Regent Street to this purpose, having devised arrangements whereby the required twenty-four different portraits shall be successfully and rapidly obtained. This is effected by the use of three plates and three cameras only, each plate receiving eight exposures. The sitter is placed on a circular dais, revolving on a centre; the periphery of this circular dais is divided into spaces, numbered from 1 to 24. The sitter being placed exactly in the centre of the dais, three cameras are placed at the proper distance, so that they shall be each exactly opposite one of the figures 1, 2, 3. This secures a direct front-face portrait, and two others nearly front, but one slightly quartered to the right, and the other to the left.

We should have remarked that the glass plate is circular, the eight portraits, when complete, being arranged round it, the heads to the centre. The first three portraits having been secured, the dais is moved round so as to bring three more numbers opposite the cameras. The plates have each been moved sufficiently round to receive another portrait, and so on for the whole of the required number, the whole operation being very speedily completed. It will readily be seen, on a moment's reflection, that whilst eight exposures are required, the first, or first and second, may be made to secure all the portraits which are at all of vital importance to likeness. In the two first exposures, six different views are secured, and these may be such as completely embody all the points of likeness and expression. In all the views at the back of the figure, the restrictions upon the sitter, as to perfect immobility of the features, may be removed, as no longer necessary to good portraiture. The full complement of portraits is thus obtained on three plates, the first containing, say, 1, 4, 7, 10, 13, 16, 19, 22; the second and third, ditto, other numbers in like manner; these plates are really more convenient to the photo-sculptor, who has simply to

revolve the plate to bring a fresh portrait on the screen with his magic lantern or enlarging camera, and thus trace his outline with the pantagraph, instead of having twenty-four plates, involving much more work in changing them. The circular plates, as Mr. Henry Claudet assured us, involve no trouble in manipulation, but are used with as much facility after two or three attempts, as ordinary rectangular plates; the whole of the operations, in fact, after being once arranged, follow in the simplest and most facile order.

Amongst the examples of the process we saw at M. Claudet's studio, were many admirable likenesses, which we recognized at once, and many more charming as works of art. How far photo-sculpture will ever become popular it is difficult to say. The cost—say, ten guineas for the first copy—will, of course, prevent its being very common: but we cannot help thinking that, amongst the cultivated and wealthy classes, the facility of the operation, the wonderful perfection of the likeness, and the real beauty of the result, must secure a considerable popularity and demand of this application of photography, as soon as it becomes well known amongst the classes to whose tastes it appeals, and whose means permit them to gratify their tastes. We understand the company, announced a short time ago for working the process, is in due course of formation, and will probably shortly announce working arrangements.

CHEAPNESS IN PORTRAITURE.

The gradual tendency towards a miscalled cheapness, an undue reduction in the prices of portraiture, has been much lamented of late, not only by those who felt the commercial evil of such a tendency, but by all who watched its injurious influence on the art. The subject was somewhat fully discussed in our pages a few months ago; but without any effective remedy being devised. We have just received a communication containing a suggestion which, it occurs to us, is worthy of the attention of portraitists generally. Change or reform of any kind is always best effected when circumstances afford a new starting point. If the introduction of the Wothlytype inaugurate a new era in photographic printing, it may afford an opportunity for some agreement or understanding amongst photographers, which shall prevent the prices falling below a standard to be determined. The photographers in various districts of America have had meetings, and came to resolutions, determining a minimum standard. Such a plan leaves each photographer to determine for himself how high his charges may be, but prevents the disastrous competition which reduces prices below a remunerative point, to the injury alike of the photograph and the photographer. We now quote the letter of our correspondent, and leave the subject with our readers:—

"Dear Sir,—An idea has struck me not remarkable for brilliancy; but in the hope it may suggest something fresh, I venture to send it.

"It is this:—Should the *Wothlytype* come into general use (which seems rather probable, if its advantages are what they now appear to be), will it not be a favourable opportunity for those photographers who have succumbed to the prevalent rage for cheapness to rise from the dust, so to speak, and cast out the evil thing (of course I allude to cheapness) from among them. To bring their prices to as equal a scale as possible, keep them up, and determine not to give way to the cutting down system; an evil which all must feel is doing more to damage photography than aught else. In my humble opinion, the licence is a wholesome provision, as it may prevent many 'loafers' from entering the field. I can easily fancy many saying, 'All very well; but don't you wish you may get it'? Well, I do rather. Perhaps you are tired of the cheap subject; therefore, if you don't think this worth insertion, you can cast it into your dead letter basket without offending.—Yours very truly, P. Horwood."

"*Bridgenorth, Oct.* 11, 1864."

THE MARSEILLES COMPETITION FOR THE BEST ENLARGEMENT.

We stated a short time ago, that the Photographic Society of Marseilles had announced their intention of opening a competition to all comers, for a gold medal to be awarded to the best enlargement. The following are the conditions for the guidance of competitors:—

The principal prize will consist of a gold medal.

Proofs intended for composition should be addressed, up to the end of November, to M. Leon Vidal, secretary to the Photographic Society, to the Union of Arts, Marseilles.

The carriage must be paid by the competitors.

Nothing will be admitted to compete for the gold medal but portraits enlarged to life-size, without any retouching whatever.

A positive obtained direct from the original negative must be attached to the enlargement.

If the jury require it, the original negative must be produced.

Enlarged proofs of views may also be sent to the society, but they will constitute a separate competition, in which a silver medal will be given as the prize.

With the aim of giving a higher authority to the decision which will follow the competition, the examination of the proofs will be confided to a jury composed of eminent photographers in Paris, whose names will not be made known until after their decision is given.

The competitors will be required to describe the process and apparatus employed, and to give any other information which they may consider necessary or desirable.

These instructions, accompanied by the name, surname, and address of the competitor, must be enclosed in a sealed envelope bearing three letters, and a motto.

This envelope must be enclosed in that which bears the address of the secretary of the Society, with the words "*Concours Photographique.*"

The proofs must have repeated on their backs the letters and the motto borne by the first envelope.

All proofs bearing any writing or signature, which will in any way indicate the name of the competitor, will be inadmissible to the competition.

After the 30th November, no more proofs will be received for competition.

Leon Vidal,
Marseilles, 23rd August, 1864. *Secretary.*

ON A METHOD OF MAKING A UNIFORM LIME-TONING BATH.

BY F. W. HART.*

The members of this society will pardon me for occupying their first meeting with so trite a subject as that which I have announced; as without a doubt, they have long since completely overcome the practical difficulties of that toning process generally known as "the chloride of lime bath."

The utility of this and kindred socities, however, must not be lost sight of; for be it remembered, all have not the same opportunity of debate and exchange of ideas; therefore, even though the subjects we bring forward may be simple in themselves, they may lead to discussions of higher matters. And, thanks to our very ably conducted journals, the report is in a few days accessible to those in the most remote quarter of our land, and I might add the world. Still bearing in mind the objects of this society, let me entreat you, gentlemen, to keep the treasury of the committee overflowing with subjects to be read this session.

Without further digression, we will proceed with this short paper. It is now some six or eight months since we first privately distributed the test papers, to enable us to know if they were generally useful. From reports, we have reason

* Read at a meeting of the South London Photographic Society, on Thursday, October 13.

to believe they are, and so thought a description of their preparation might be useful. It is as follows:—Make a solution—

Iodide of potassium	...	...	10 grains
Water	...	...	...	10 ounces;

then take 25 grains Glenfield starch, and make into a stiff paste, with a few drops of cold water; to this add 10 ounces of boiling water; mix the two solutions, pour into a clean porcelain tray, and immerse sheets of Saxe paper. Take out, dry, and preserve from the air, as it is well known continued atmospheric action colours papers prepared somewhat similar, which we use for the detection of ozone.

To employ these test papers, the toning bath should be prepared in its full quantity before dipping them in. A very convenient way is to take, say two pints of water, more or less, according to the quantity of prints to be toned, drop in two minims of chloride of lime solution, mix well with a glass rod, and then dip a slip of paper in half way; should the solution not tint the paper, another minim or two may be added, stirred, and a fresh piece of paper dipped in. If now the paper is tinged, to a faint bluish grey, sufficient has been added; if to a decided blue, too much. Thus you see the oft-repeated questions of "how much chloride of lime of the oil shop am I to use?" "what is a saturated solution?" &c., &c., are answered. These questions need no longer perplex, it being of no consequence what strength that article may be when purchased, a trial by these test papers will soon tell you how much of that particular solution it is necessary to use. It is advisable that the solution should be cold and tested between small addditions; and that it should be conducted in daylight, as delicate tints are not easily seen by artificial light. A strong solution of chlorine destroys the colour almost as soon as formed.

Having prepared the bulk of solution as above, I never ascertain if the gold solution is acid; if so it is neutralized by preference with precipitated chalk; and then mixed with the chlorine solution, which may contain from one to three grains pure chloride of gold per pint, according to the season, and other circumstances, connected with the character of the negative in giving vigorous or thin prints.

In conclusion, I will just go through the experiments of mixing the chlorine solution, and present you with a few slips of the paper prepared as directed.

PHOTOGRAPHIC GONIOMETER.

PAR M. L'ABBE PUJO.

About three years ago, I read a description of M. Chevalier's photographic plane table. This new application of a beautiful art attracted my attention. But, upon reflection, I soon became convinced that M. Chevalier's method must encounter insurmountable difficulties in practice, because it distorted the picture, so as to render the signals unrecognizable: and ecause it required a perfect mechanical motion. I then asked myself if it would not be possible to derive from the ordinary photographic picture all the elements necessary for the calculation of angles; and following step by step the path of the luminous rays through the objective, I was fortunate enough to find a very simple and elementary method. By means of a level adapted to the camera, we arrange the principal optical axis horizontally; the glass plate which receives the picture is placed perpendicularly to this axis, and the frame marks the outlines of the two planes, the one horizontal, and the other vertical, passing through the optical axis. Taken under these conditions, every photographic picture is a perspective, with its horizontal and vertical lines, and point of sight. We also know the principal radius, and, consequently, have all the necessary elements for calculating with precision the azimuth or the angle of height of any point in the proof with the two planes of perspective.

The camera, thus arranged, acts as a theodolite; pointed at the two extremities of a base, it reproduces the immense panorama that unrols itself before the operator, inscribing as it were beside each signal the azimuth and the angle of height.

A year has elapsed since this method was submitted to experiment. With the aid of one of my former pupils, M. Fourcade, I have made two pictures of a very extensive barracks, and from these proofs we constructed a plan. The result agreed with all my anticipations; the dimensions, angles, and lines all came in their proper places, and we were satisfied that, by operating with a graphometer from the extremities of the same base, we should not have attained greater precision, if even so great.

M. Laussedat has the following observations upon the above.

The principles upon which M. l'Abbé Pujo rests his method are identical with those I have sought to establish for a long time, as may be shown by consulting,—

1. The *Comptes Rendus des Séances de l'Académie des Seienees* (Nov. 1859 and June 1860), which contain the analysis of my *Mémoire* and the report of M. Laugier, followed by the approval of the Academy.

2. No. 17 of the *Memorial de l'Officier du Genie.*—These principles are also the same as those of which I have made the application to the perspectives, designed by the aid of the camera lucida. The *Mémoire* I drew up on this subject in 1850 has been deemed worthy of the approbation of the Minister of War, and was published by his order. To this M. l'Abbé Pujo has replied as follows:—

"I have never seen the article on this subject published by M. Laussedat. I cannot therefore reply in full, but must content myself with offering a few explanations.

The idea of applying the camera obscura to raising plans is not new, as it was suggested in 1839 by Arago and Gay Lussac. The relation that exists between the lines of a mathematical perspective and the corresponding lines of objects, are given in all special treatises. There will therefore be no dispute on these two points.

Besides, the principle of our method consists not in asserting that the photographic picture is a mathematical perspective. This would be an error; for no lens exists which gives a picture in exact perspective.

But we are bound to take the distortion into account, to correct the resulting errors, so as to obtain with the apparatus now employed data which an objective of an ideal and unrealizable perfection would furnish.

Thus to deduce from our proofs the *well known* relations that exist between the lines of a perspective and the lines of the objects represented; to imagine methods, apparatus, and processes, to arrive at this result; to utilize the elements obtained for the construction of plans and the geometrical representation of bodies: such is the aim that we have proposed to ourselves.

If M. Laussedat has had the same idea prior to ourselves, we shall be the first to recognise his priority. If that eminent officer has attained this aim by means we have contrived, we shall make it a conscientious duty to leave all the merit of this discovery to the first inventor.

When our work is published, it will be easy to establish a minute comparison between M. Laussedat's method and our own; we shall then be able to judge, with full knowledge of the case: if we have followed a beaten track or a new one, to attain the object pointed out by two illustrious servants in 1839.—*Les Mondes.*

ALBUMENIZED PAPER.

BY DR. SCHNAUSS.

It cannot be denied that albumenized paper has greatly contributed to bring photography to its present state of perfection. At one time it was rejected by portratists, because they were of opinion that its glossy aspect injured the artistic character of the pictures. Now, on the contrary, it is rare to see a portrait on plain salted paper. The

delicacy, vigour and brilliancy of the portrait are singularly augmented, it is true, by the application of albumen, and the negative does not require an excessive strengthening to yield good positives, provided only that it has been uniformly developed. At first photographers had too much faith in retouching, and more than one defective negative was declared admissible from the aid afforded by a skilful hand; it was even the custom to suppress the natural backgrounds, and replace them in the printing with artificial ones, the result was frequently a white outline to the object. Now retouching presents certain difficulties upon albumenized paper. Not only is it less easy to obtain a perfect gradation of tones with the colours employed, but the touches are heavy and injurious to the general effect; besides the pigments do not lay well on albumen.

The colouring of albumenized pictures has recently made great progress, and very excellent results are now attained; many artists keep their processes secret, still there are many formulæ which give more or less success.

One of them, but not the best, consists in rubbing the proof with some substance that removes the surface, a mixture of sand and gutta-percha for example, then to apply the colour, and afterwards varnish.

It appears to us preferable to cover all the proof, or only those parts which are to be retouched with a substance which will cause the colours to adhere, and to mix the colours with the same substance. Among the substances capable of producing this effect, the best are honey, or any solution containing syrup, gum, and oxgall. By simply moistening the proof with water, then rubbing it gently, we facilitate the application of the colours. If a little gum be mixed with the colours, no trace of the retouch, will remain. The addition of a little carbonate of soda to the water renders the retouching more facile, but the alkali injures certain colours. My own experience induces me to adopt the following method:—

Cover the entire proof with oxgall, by means of a large brush or piece of sponge; colour it afterwards, as usual, and when dry cover with a transparent varnish, which is indispensable to render the colours brilliant.

A process has been published recently, which consists in covering the proofs with a transparent varnish, and painting them at the back in oil colours. This method gives remarkable results with practice, provided that the tones are selected with taste, and applied carefully and evenly. It is advisable to frame a proof thus treated immediately, upon a white ground, because it is difficult to mount the proofs upon cardboard, and fasten them with aqueous substances, such as starch, gum, and glue. A solution of india-rubber, or benzine, may be employed, but I have not tried it; it is possible that it would attack the colours.

Albumenized paper gives more trouble to the photographer in toning than in retouching or colouring. The most frequent defect consists in marbling. The thicker the paper, and the more it is albumenized, the more this inconvenience presents itself. A thin paper, lightly and uniformly albumenized, is exempt from this marbling, and tones much better. In certain parts, for example, at the edge of the paper, where there is sometimes too much albumen, and sometimes too little, it may be readily observed that, in the first case, the toning proceeds more slowly, the coating remains redder, and, notwithstanding a prolonged immersion in the bath, always appears like spots and red streaks.

It is to be remarked that, in these spots, the water, and consequently the gold and silver of the baths, are rejected, while the other parts remain moist, which explains the red hue. What takes place here on a large scale, also occurs in those places where spots of the same colour are formed. The inspection with the microscope, which M. Liesegang made with a paper of this kind, led him to conclude that the texture of the paper has much to do with this result. Putting aside the idea that the repulsion of the baths, in certain places, is the cause of this phenomenon, and that the marbling commences in the nitrate bath, we must seek the means of avoiding this repulsion, and thus obtaining a uniform penetration. Perhaps, the addition of alcohol to the albumen bath, and a dilute alcohol bath, preceding the toning, may prove efficacious; at least, this is what I have experienced under various circumstances.

When we are, unfortunately, compelled to employ albumenized papers which marble, it can be remedied, in part, by employing a concentrated nitrate bath, upon which the paper is floated for five minutes, and if a vigorous toning is given to the proofs, then a good washing in distilled water, before toning; lastly, the toning must proceed slowly, rather a weak bath.—*Le Moniteur de la Photographie.*

ÆSTHETICS OF PHOTOGRAPHY.

Being Short Lesson in Photography.*—No. 33.

We have demonstrated sufficiently that the very best of lenses distorts the perspective of a landscape, unless the focussing of the picture be performed with rigorous optical intelligence. The rule we gave in our last lesson, by which the perspective can be preserved, can be very easily tested. Assume a position on a raft, log, stone, or boat, a hundred or two hundred feet distant from shore, and let the most distant prominent object in the village, ranged upon the banks of the Rhine or the Hudson, form the point upon which the focus is to be adjusted. Arrange everything else according to art, and take a negative. We maintain that this negative will be the nearest approach to perfection in perspective, as far as the lens is concerned, that can possibly be taken. For the water between the lens and the shore presents, or is intended to present, no object that will attract the attention by reason of the distortion of its individual parts; and the objects on the shore are situated at or beyond the distance at which they are all nearly equally in focus as soon as one of them is in focus. The slight difference in the focal length of these objects will have a tendency, as already remarked, of increasing the magnitude of all objects as their distance diminishes, and this increase in magnitude, however slight it may be, is a mere additive quantity to that produced by the increase of the visual angle under which the objects are beheld.

A negative so taken will produce a photograph that will exhibit decided evidences of *true* relief, and thus become worthy of being classified among works of art. Such a picture, however, may not be perfect by reason of other disturbing causes, which it now becomes our further duty to investigate.

The disturbing causes in question are those produced primarily by the *sort and intensity of light* used; secondarily, by the *imperfect chemical reactions* arising from the imperfections of focussing; thirdly, by an imperfect knowledge of the varying degrees of actinic action of the differently coloured objects comprehended in the scene; and finally, by a want of taste displayed in the artistic choice of an object modified by colour, time of day, and collocation of parts.

Imperfections in Photographs arising from the Sort and Intensity of Light used.

The beauty of a photograph, whether a portrait or a landscape, depends essentially upon the due management of the light, and the due management of the light consists in suffusing the objects with that amount and sort of it as to illumine them *agreeably*. This definition, it is true, is far from being circumscribed within intelligible limits, because the organization of the senses is subject to development by education. According, however, as the senses become more and more developed by cultivation, more nearly do the conceptions of the beautiful, in different individuals, seem to coincide. It is to this stage of sense-development that we refer when pleasant sensations or agreeable feelings are quoted as the normal conditions of a definition.

* From *Humphrey's Journal.*

In many instances, light produces effects so glaring as to be disagreeable to all tastes, and each one, whatever his occupation, shrinks from them involuntarily, so as to *see more agreeably.*

Thus a lady establishes a position for her mirror where the direct rays of the sun cannot reach it; this she does either in consequence of previously gained knowledge on the subject, or by virtue of disagreeable sensations produced when the sun could so strike directly upon it. The shoeblack seeks a shady nook to polish his boots, where the eye is not strained in viewing the progress of his operation. The mariner, too, involuntarily turns his eyes away from the dazzle and glitter of the ocean, and seeks relief by looking into the dark monotonous hold. Why is this? Because the eye strains itself in its endeavours to see distinctly when objects are so brilliantly illumined, and thus learns to shun them.

It seems paradoxical to state that, the more intensely lighted and the more direct the reflected rays, the less distinct will the object be. For instance, a board fence is covered on both sides with those illustrated announcements of Barnum's Museum, or the daily bulletins from the Secretary of War during victories. The sun is shining early in the morning directly on one side, whilst the other naturally is in the shade. Now study the anomaly. On the brilliantly illumined placards it is impossible, probably, to *discern a single word;* on the shady side the *minutest letter* can be read easily because it is agreeably distinct.

Many similar and analogous instances might be adduced to prove this point. It may be well, whilst the subject is under consideration, to define the cause of this apparent anomaly; for the knowledge will be of great value hereafter.

The cause is a curious one, and, when first mentioned, appears far-fetched; it is simply this; between the object, brilliantly suffused with sunlight, is space; and this space is filled with matter consisting of air and vapour in myriads of infinitely minute particles, all of which become illumined by the direct solar or reflected rays passing from the object to the eye, and act like so many original sources of light, or so many reflecting globules, so that these alone become visible as dazzling scintillations.

This fact becomes still more manifest by causing the reflected light to pass through a pane of glass or a lens before it reaches the eye, or to cause the sun to shine upon either of them directly; in either case the pane or the lens will be quite visible, but the object beyond will be scarcely discernible.

Many a photographer has been puzzled by this anomalous property of light, which, to our knowledge, is now for the first time explained. Throwing more light upon the model ought naturally, as we used to suppose, produce a more brilliant picture; but by hard practice and experience we have had to acknowledge that the result was never as we had, *prima facie,* the right to expect; and the reason, we now learn, is the *illumined matter* between the object and its picture, which, by its brilliancy, obscures the object from sight.

By practice and experience, hard-plodding photographers have long learned how to modulate their light, so as to obtain the most agreeable and effective results, without possessing any definite ideas of the cause of the trouble. We now begin to handle the evil as we would vermin, as a tangible enemy whose habits, natural history, and habitats are familiar to us. We treat it intelligibly.

The *Ghost in the lens*—one cause of which was carefully analysed in an article which appeared on page 164, vol. xv. of this Journal*—is partly caused by the illumination, at a certain angle with the sun, of the air and vapour in front of the objects depicted. In this case a picture of the illuminated matter is taken at the same time with the true objects whose picture is to be taken. Do not let it seem strange that a *picture of air* can be taken; for air can easily be seen (the clear sky is air), and air of different density can easily be descried, and air in motion is almost as visible as a cloud in motion. Witness the ascending and undulatory currents around a heated stove when illumined by the direct sun's light; they are quite visible; but they are currents of air of different density. By an instantaneous process they may be reproduced as easily as the waves or breakers on the ocean. Let this, then, be an acknowledged fact in photography: that *air can be photographed.* Many curious apparent discrepancies will then eventually be cleared up by this recognition; and the progress of photography will gradually approach perfection.

Whilst taking stereographs in the ravine of Cashong Creek last week, we were forcibly struck with this property of taking photographs of air, and have learned to acknowledge them as great nuisances which it is well for the photographer to eschew. This can be done both in gallery and landscape photography to a certain extent.

Our task to-day then is, having mentioned one trouble produced by light, to show how it can be obviated; and thus we shall proceed, eliminating each trouble before we search for another.

To avoid taking Air-Photographs in Pictures.

Suppose an engraving is to be reproduced as a photograph, what plan is the best?

There are two plans: the one by illuminating the engraving by the direct rays of the sun, and the other by diffused light. In either case the space between the engraving and the lens must be excluded from all other rays of light, excepting those which proceed by reflection from the engraving. This is effected by attaching to the front of the lens a long cone of light material, blackened within, and reaching nearly to the engraving, leaving only sufficient space for the sun, &c., to shine upon the picture to be produced. In this way the engraving alone is illumined, whilst the space in the cone is kept comparatively, so to speak, dark.

The particles of the air, therefore, in the cone, not being lighted up, will produce no actinic effect, will produce no air-photograph; the engraving alone will be reproduced, *clear and unveiled.* With reference to this property of light, it is evident that the portrait, glass-house, or gallery can be so arranged as to produce the same correcting effect. [Vide "Sunbeam," p. 32, &c.] The space between the sitter and the lens must be kept as dark as it is possible to construct the glass-house; it is not necessary to state here how this is to be effected, because every gallery has some peculiarity of construction that prevents the introduction of each minute requirement that aids in carrying out a general principle in reference to a *certain* construction. But the *space must be dark.* In fact, keep as near as possible to the mode employed in copying an engraving; above all things, allow no direct light from the sun to shine on the lens or the space between the lens and the model; even the light from the sky must be shut off from both those parts as far and as much as it is possible, without detriment to the proper illumination of the model. In this way, other things and arrangements being good and normal, the picture of the sitter will be clear on the ground glass, and its reproduction by chemical means will be equally so.

From the foregoing remarks, false conclusions may be drawn; it may be supposed that there is no limit to the intensity of illumination of the sitter as long as no direct light can illumine the space of air between the sitter and the lens.

We must recollect that the intensely illumined surface of the model, and especially when the reflected rays from that surface pass along the axis of the lens or parallel to it, may illumine the air sufficiently so as to produce a haze on the ground glass or an air-photograph on the print. On this account light of less intensity has been found to be most efficacious in producing clear photographs; the reason now, of course, is evident.

* See Photographic News, vol. vii. p. 534.

In order, therefore, to obtain a *clear and unveiled picture* on the ground glass, and thus obtain a *beautiful* print from a negative so taken, there stand out in full relief two rules or conditions :—

1st. The air-space between the lens and the model must be as dark as compatible or possible with the nature of the gallery.

2nd. The light that illumines the sitter must be actinic light alone, and only moderately intense (as it will be when depurated of the more luminous portion of the spectrum.)

The same rules prevail, or would prevail, if they could be carried into execution in landscape photography. Over these conditions, however, we have little or no control, where the hemisphere is our glass-house, and the sun-illumined landscape our model. We can draw conclusions what is best to be done or not to be done under given circumstances.

1st. The best view can be taken immediately after a shower, when the air is clear and the sun behind a cloud, and when the landscape is illumined by this cloud ; the photographer's back being turned to the source of light or nearly so.

2nd. If the sun is shining, and evidently will continue to shine during the whole day, choose that time as the most appropriate for taking the photograph when the rays from the illumined atmosphere must pass off *from* the photographer and not *towards* him. By doing so the *ghost* or the *air-photograph* will be partially avoided.

The production of shadows, their direction, and the actinic agency of light from certain reflecting surfaces have all to be taken into consideration in connection with the preceding property of light on air or vapour in landscape photography, so that this department, apparently the easiest of all, is by far the most difficult of success. *Au revoir!*

Proceedings of Societies.

South London Photographic Society.

The first meeting of the Winter Session was held at the City of London College on the evening of Thursday, October 13th, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The Chairman, in calling attention of members to a number of specimens on the table, remarked that members would do well to make the Society generally partakers of the pleasures of their summer rambles, by bringing to the meetings the photographs they had secured.

The Secretary read the minutes of a preceding meeting, which were confirmed. The following members were then elected :—Messrs. A. C. Sterry, H. R. Nichol, J. T. Taylor, E. Cocking.

Mr. Cooper exhibited a number of his charming examples of double printing.

Mr. Howard exhibited prints from some of the negatives obtained at the Society's out-door meeting at Beckenham Place, by himself and by Mr. Larchin, and some very fine views taken during a Summer holiday in North Wales.

The Chairman called attention to the two large and very beautiful photographs now ready for distribution as presentation prints, either of which was a handsome equivalent for a year's subscription. These consisted of Mr. H. P. Robinson's charming composition, "Somebody's Coming," 12 by 10 inches, and Mr. Annan's fine landscape, "Ben Lomond from Aberfoyle," 16 by 12 inches.

Mr. Wharton Simpson exhibited a number of specimens of the new process of printing known as the Wothlytype, and briefly described the mode of manipulating and the claims of the process. After the prints had been examined, and much admiration expressed, a conversational discussion followed.

Mr. Wall said it was somewhat singular that in the same number of the *Times* newspaper which announced this new process, and referred to collodion as one of the agents employed in producing the permanent prints, there was a paragraph referring to some recent experiments which proved that gun-cotton spontaneously decomposed. He thought that if this were so, and the prints were on a film of collodion, the permanency was questionable. He thought the attention of photographers should be called to the experiments on gun-cotton to which he had referred.

Mr. Simpson said that the experiments to which Mr. Wall doubtless referred were those of M. de Lucca, which, whilst undertaken chiefly with reference to gun-cotton as an explosive agent, had also a certain amount of interest for photographers, and he had published the report presented to the Academy of Sciences in the News. Pyroxyline, it was well known, when kept in certain conditions, was liable to spontaneous decomposition, but in the attenuated layer and changed conditions of a film of collodion, he did not think there was much ground for apprehension of decomposition.

A Member asked if the collodion film was in the habit of decomposing.

Mr. Simpson believed there was no case on record of the destruction of a photograph by the decomposition of the pyroxyline forming the film.

The Chairman said he believed that at the present time the sources of uranium were somewhat scarce, in which case, if it came much into demand, it would probably be dear.

Mr. Martin confirmed the Chairman's conjecture. Very little pitch-blende, the source of uranium, was known at present to exist. It was chiefly found in Sweden and Germany, but unless some fresh source were discovered, a serious difficulty might be experienced in its general use for photographic printing purposes.

Mr. Simpson said that although the supply of a natural product was not regulated by the laws which govern supply and demand in manufactured articles, yet it might be generally regarded as a rule, that demand will create supply, even in such matters, as it would stimulate research. There were other metals, moreover, which behaved similarly under the action of light, by which it was quite possible similar results might be obtained.*

After some further conversation on the subject, the matter dropped.

Mr. Howard remarked, that he had recently noticed a question by a correspondent of the Photographic News as to the value of the plan of giving a final coating of a solution of gallic acid to Fothergill plates. The specimens of Welsh scenery before the members, were all from Fothergill plates treated in this way, and he had found no tendency to stains or any other difficulty, although five weeks had elapsed between the preparation of the plates, and the development.

The prints in question were remarkably clean, delicate, and soft, in no respect inferior to prints from wet plate negatives.

Mr. Hart then read his paper "On the Preparation of Lime Toning Bath." (see p. 50.)

At the conclusion of the paper, Mr. Hart proceeded to illustrate, by experiment, the action of chlorine on the test paper, to which he had referred, some examples of which he distributed.† The paper was sufficiently delicate to show the presence of one drop of chloride solution in 10,000 of water. The colour produced, when sufficient chlorine was present, was a very delicate greyish blue.

Mr. Simpson said that the means of testing the amount of chlorine present in a solution of chloride of lime, would be a great boon to photographers, inasmuch as the uncertainty on this subject had been the one difficulty which prevented many photographers using the lime toning bath.

Mr. Sebastian Davis said his experience was greatly in favour of the lime toning bath. He used Beaufoy's concentrated chloride of lime, a very little of which was sufficient. He used the bath over and over again, adding a little gold or lime, as it appeared to be required. He believed many difficulties arose from adding excess of chloride of lime.

Mr. Fitch asked Mr. Davis if he found any difficulty in toning prints, which had been previously washed, to remove the free nitrate.

Mr. Davis always washed his prints, and found no difficulty ; but he preferred slow toning.

Mr. Fitch found that he could tone his prints rapidly and well, when they were immersed in the lime toning bath, without

* When a demand for uranium was created a few years by its use in producing coloured glass, a supply was readily found, and the extent of the source was not, we believe, fully ascertained, inasmuch as the demand ceased before the source was worked out ; and no further demand at the time existing, the workings were abandoned.

† Mr. Hart informs us that he will have pleasure in forwarding test papers to any one sending him a stamped envelope.

previous washing; if they were thoroughly washed, they took hours to tone.

A conversation on this subject followed, in the course of which,

Mr. Harman said he always washed his prints thoroughly, and found no difficulty in toning, whether he used chloride of lime or acetate of soda with the gold.

Mr. Simpson said that there was very little doubt that unwashed prints toned more readily than those in which all the free nitrate had been removed by washing. But the rapid touing was secured at a serious expense; in the first place, the silver was lost, which might have been recovered, and, in the next place, the gold bath was rapidly decomposed, as nitrate of silver rapidly reduced the gold.

Mr. Blanchard remarked that prints, which were toned without washing, often lost a great deal in the hypo, as a kind of factitious toning was induced, which the hypo removed.

Mr. Davis, said, that this was confirmed in his experience.

Mr. Martin said, that the electrotypo process, showed an analogy to this. If the action were rapid, the deposited metal had very little cohesion.

Mr. Simpson, and Mr. Harman, made some remarks in confirmation.

A conversation followed, as the salt of silver formed on the surface of prints, washed with common water.

Mr. Hart thought it was principally sulphate, as he had found London waters show the presence of baryta test.

Mr. Martin thought it chiefly carbonate of silver, as analysis showed that the chief salt in the London water was a carbonate. To make the baryta test satisfactory in such a case, nitric acid should first have been added.

Mr. Harman asked if any one had had any experience in fuming paper with ammonia. He had been working with a most intractable sample of paper, which, do what he would gave him mealiness; fuming had entirely cured it.

Mr. Simpson, said the subject was an important one, which had not yet received sufficient attention. He hoped Mr. Harman would embody his experience in a paper, and illustrate it with examples.

This suggestion was favourably received, and Mr. Harman intimated that he would endeavour to act upon it.

Mr. Taylor exhibited some of Mr. Johnson's panoramic pictures, and Mr. Hughes' views of Osborne, from tannin plates.

Mr. Blanchard moved that a special vote of thanks be presented to Messrs. Robinson and Annan, for placing such beautiful photographs at the service of the society upon terms which he was certain could not be remunerative. This was carried unanimously.

After some further business, the annual dinner of the Society was announced to be held at the Bridge House hotel, on the 20th of October. The proceedings then terminated.

Correspondence.

FOREIGN SCIENCE.

[from our special correspondent.]

Paris, 19th October, 1864.

Mr. Tunny has communicated to the *Moniteur de la Photographie* his process for enamelling positives, especially *cartes de visite*, the details of which have appeared in your columns.

This process possesses many advantages, among others of preserving the pictures from the action of external agents, of giving them remarkable delicacy, and causing the grain of the paper to disappear entirely, which is a great advantage when producing a copy of a paper positive.

M. Moitessier offers a new toning agent to the notice of photographers, the composition of which he keeps secret. Whatever it may be, he sells it to operators in packages of 25 grammes each, one of which, dissolved in 600 grammes of distilled water, is added to a solution of 1 gramme of chloride of gold in 600 grammes of water. The proofs, well washed, are immersed in the above solutions mixed at the moment of using. In a few minutes the proofs acquire the desired tone. Among the advantages claimed for this preparation are economy and infallibility. Proofs that refuse to acquire a good tone with other preparations, acquire in this toning bath the beautiful black tones so difficult to obtain. There is no difficulty in using it, and its energy permits of a great number of proofs being toned with it. By employing an old toning bath as the last washing water, double the usual number of proofs may be toned.

M. Liebert, who has had a long photographic experience in the New World, has addressed an interesting communication to the *Moniteur de la Photographie*, from which I transcribe some portions that I think will interest your readers. He states, that he has established in Paris a photographic studio on the American plan, where he is ready to operate with his solar camera, in presence of those amateurs who may desire to see it. His aim, in fixing himself at Paris after having practised photography for ten years in the New World, is to apply the processes exclusively adopted on the other side of the Atlantic—processes which he has described *in extenso* in his practical treatise on photography. For this reason he has adopted the title of "Americau Photographer," and so far from keeping the secrets of the processes employed on the shores of the Mississippi, he hopes to become the propagator of discoveries and applications but little known in France.

In fitting up his photographic studio, he sought for the best apparatus of all kinds, and tried a great many objectives manufactured in France, England, and Germany. He had a great prejudice against French objectives, unfortunately justified by numerous trials; so he thought, before making a definite choice, of employing only the lenses of the two most eminent English opticians, Ross and Dallmeyer, recognising the difficulty of experimenting with those of C. C. Harrison, of New York. "I had already bought a 'quick-acting' binocular No. 3 Ross, for *cartes de visite*, and had ordered a three-inch and a five-inch lens, for portraits, from that excellent maker, when I received a visit from M. Darlot, of Paris, who proposed to send me some lenses of his manufacture. Upon trial, I confess I was greatly surprised at the excellence of these lenses, which I decided to keep, after having submitted them to the most conscientious trials; not only the results, as to delicacy of detail, have been excellent, but I have proved, that while covering a very large surface with perfect sharpness, the luminous field is remarkably great and intense, in proportion to their comparatively short focus. There is also another advantage which is not to be despised, and that is, their moderate price. It is, therefore, from a sense of justice that I take pleasure in rendering public testimony to this optician, hoping at the same time to render service to my colleagues in photography in giving them these particulars.

"I must especially note in this place the advantage I have remarked in employing the Ross's triplet for taking views; it is impossible to produce anything sharper or more delicate in all the planes of the picture: the marginal lines are perfectly straight, there is no distortion, and the exposure required is much shorter than with the single lenses generally employed. In my opinion, these lenses are equal in quality to the "globe lenses" of Harrison, while they work much quicker.

"If I am impartial in praising what is good and excellant; I am no less so in pointing out what my experience has shown me to be bad. As I have stated above, wishing to create a first-class establishment in Paris, I sought to obtain everything the most perfect of its kind. But unfortunately, we must go to school all our lives, and it is only by working oneself that we can ascertain the advantages or defects of certain portions of the material on which frequently the beauty and purity of photographic pictures depend. In America I had always employed flat grounds, painted in distemper, or in oil *mat*. Here I heard great praise of draped, or velvety grounds, and I allowed myself to be cajoled by them. I adopted velvety grounds of various colours. Alas, I quickly recognised that the new is not always the good, and this truth was specially applicable in this instance, for the background of all my pictures, far from having that uniformity so desirable for the harmony of photographic portraits, was *woolly*, mottled in the most

deplorable manner. At first I sought for the cause in the impurity of the iodide film, in the application of the developing solution, &c., till at length after a great number of experiments, I became convinced it arose simply from the grounds, the velvet of which, otherwise so delicate, must be excluded from every photographic studio; as, besides the defect I have noticed, they cannot be touched without becoming spoiled. I soon removed them, and replaced them with grounds painted in distemper, and in oil *mat*; and I recommend all those who have, like myself, been induced to adopt this novelty, and doubtless experienced the same inconveniences, to cut the matter short, and get rid of a constant source of failure and annoyance.

"As soon as my occupations afford me sufficient leisure, it will give me real pleasure to send some memoranda of a host of processes practised in America."

M. Ommeganck describes in the *Bulletin Belge*, a simplified drop measure. "The measuring of the liquids and solutions in photography is generally made with graduated measures; but for strengthening negatives upon glass, we also reckon by drops the quantity of nitrate solution to be added to the pyrogallic, or other developers. We have for some time employed a very simple apparatus, which photographers will find very useful. It consists of an ordinary bottle of the capacity of about four ounces, into the neck a cork is fitted, having a hole bored in its centre, through which a glass tube of about four inches in length is passed, a little less than half an inch below the lower part of the cork, within the bottle. The upper end of the tube must be quite circular, with the cut edge left. The tube may be cut with a triangular file moistened with turpentine. The cut edge of the tube allows the liquid to drop always of the same size, without running down the outside of the tube, so that the usual practice in the laboratory of melting the ends of glass tube in the spirit lamp, must be avoided. To make use of this drop-counter the bottle is about half filled with the liquid, and taken full in the hand, and held over the vessel to recieve the drops: the warmth of the hands expand the air contained in the flask, and the drops flow out neither too quick nor too slow.

M. Ommeganck also remarks upon the disuse of the iconometer in photography; a very useful little instrument, by means of which we can tell beforehand two very important things:—

1st. What instrument we must employ in photography to represent any given object on a certain scale, whether it be group, landscape, picture. &c., the distance being given.

2nd. At what distance we must place a camera from an object, when we have no choice of instruments, to include a given subject within a determined space.

This instrument serves, in fact, to show whether what the photographer proposes to do is within the limits of possibility, so that he need not carry all his baggage to a place and then find, that he has made wrong calculations. This instrument need not be costly; it can easily be constructed with a double watchmakers' eye-glass: it is a minature camera obscura, and, furnished with its objectives, it gives little pictures, and may serve to produce little photographs. It is fitted with a ground glass, upon which the images of objects to which it is turned are received. A series of squares is traced upon the ground glass, corresponding with the various apparatus at disposal. Every object included within the limits of a frame, may be reproduced by the corresponding apparatus, and, of the dimensions indicated.

TOUCHING PATENTS AND MANY OTHER THINGS.

Sir,—At this dull season of the year you may possibly find me a little corner for a few remarks on the above theme, suggested by your advertising columns. I have always considered the advertisements of a newspaper to shadow forth a veritable microcosm, and I aver, that, from the announcements so made, there is more to be learned of what goes on in the business world than from any other source. That is why I always read the *Times* advertisements, and, *ergo*, the like announcements in the Photographic News.

You, in common with the editors of the other photographic journals, have ever and anon deprecated the taking out of patents by anybody for processes or improvements in connection with the photographic art. But I am free to confess that you have done so with qualifications which have redeemed your objections to what I consider a very proper protection to inventors against copyists, imitators, and pirates. This is very much to your credit as well as your discernment.

Your *confrere*, the *Times*, and some other much smaller *confreres*, have done all that they could do to depreciate the value of a man's inventive faculties, arguing that what any man invents, discovers, or renders practical, everybody else is at once entitled to reap the benefit of, whether the actual inventor, discoverer, or original practitian, derives any profit or not; in fact, that a man holds his brains only in trust for the benefit of other people. But I entirely dissent from this view. As long as there are persons in the world ever seeking what ideas they may devour, there will be no inducement for an originator to devote his time and money to the development of an idea, any substantial return for which he must share with any number of people who may choose to pounce upon it.

That such persons are numerous enough I have noticed to be the case, more in matters photographic than any other.

Take two or three instances in point, from your own advertising columns.

In the matter of paper, A issues an advertisement calling his paper "celebrated," and announces it by the insertion of a very conspicuous wood block. B, in a week or two, invades your columns with a wood block also. A adopts a trade mark; B comes out with another, so similar, that a casual or indifferent observer might easily mistake one for the other. After a time, B discards his wood-cut, possibly because somebody awakes his apprehension to its extreme ugliness, or possibly because your publisher did not feel disposed to disfigure his advertising pages with a block which must have been cut by an apprentice, and might have been cut with an axe. B then appropriates the word "celebrated," evidently with the view of confounding the paper he sells with that manufactured by A, whether or not continuing the imitative trade mark I cannot say. The word "celebrated," and the trade mark, so close an imitation, would go far to deceive those who are not careful observers of the times.

For a year or two, these gentle ignorings of *meum* and *tuum* pass unnoticed. A, who is rather an independent party, I fancy, probably not caring much about the matter.

Now, I observe that C has extended the system of appropriation initiated by B. C announces that *he* has adopted a trade mark "stamped on every sheet"—just as A commenced and advertised, in the very same words, a couple of years ago, and I dare say still continues—and threatens the infliction of all sorts of pains and penalties on those who may sell paper made by X, Y, or Z, professing it to be paper of his (C's) manufacture. In this he is quite right, should anybody do it.

You will clearly discern that the courses adopted by both B and C are merely milk-and-watery imitations of the particular line chalked out by A.

I suppose there is no law to prevent either B or C, or any other letter of the alphabet, appropriating the ideas of the initial A; but I know, from the honest way in which you have always advocated questions of this kind, you will entirely disapprove of any such brain-sucking as I do. Nothing can be more paltry.

C advertised some time ago, that his paper was rolled on—say, plates of rubidium—very expensive plant no doubt thought D, who straightway copied the idea, and, as he fancied improved upon it, by announcing his article as rolled on, say, slabs cut from the philosopher's stone. Why does not B advertise *his* as being rolled on a plate cut from "one entire and perfect chrysolite?" Let me commend this idea to his imitative genius.

At another time, when the German enamel paper came up, A advertized it under its own name, fairly describing it as the actual makers in Germany described it, "The German Alabaster Enamel Paper." Next week, B flourishes in the Photographic columns with *his* "porcelain enamel" paper.

Then F, one fine morning, astonished the world with "tinted" albumenized paper. Next week, B produced "*his*" (how euphonious) "roseate tinted" paper. Another instance of B's intense anxiety to supply the photographic world with the fruits of other people's ideas.

The tinted papers having had their day, F, who, to his credit as far as I have observed, does not copy, originated another idea. He advertised a paper called, let us say "No. 1," stated

to be so prepared as to produce certain tones; and another, say "No. 2," to produce certain other tones with much less than the usual consumption of gold. The ink with which your paper had been printed, could not have dried before our friend B, like a jack in the box, reappeared upon the scene with another parrotical announcement. He too had a couple of kinds of paper, *mirabile dictu*, possessing all the wonderful toning properties of those announced by F, and, still more curious and interesting coincidence, with "much less than the usual consump- of gold." It was a most wonderful thing to my fancy, that the same idea should strike F one week, and B the week after. But we have often heard of great discoveries being made contemporaneously by persons living in far different longitudes. Possibly, it is still more natural that persons breathing the atmosphere of the same city, should conceive simultaneously the same idea.

I refrain from mentioning minor coincidences in the several advertisements, obsolete and current, of A, B, C, D and F, because the enumeration would occupy too much of your space.

About the same time, Shakspere being then uppermost in the minds of our countrymen, G and H reproduce in photography, the Shakspere Gallery (I think it was called), to sell at a guinea —and cheap enough at that. But B was on the alert, determined that if he could gain neither reputation nor profit himself, he would certainly not, if he could help it, leave any profit for any body else's garnering. Wherefore the ubiquitous B immediately brings out a copy of the same gallery to sell at 5s.—rather less than it cost, I imagine—and a case of the "biter bit."

Take chemicals. One maker, I, advertises in your columns. Your printer sets his advertisement up in a particular fashion; after a bit, J, not an actual maker, but a retailer, sends your publisher an advertisement, and has it set up in precisely the same type, with precisely similar blocks.

So with collodion and other things. Need I go into the story of the tents, or the history of the washing machines, or the carbon process, or the photographic claims, or the triplets, or a dozen other photographic developments, which I do not at the moment call to mind?

Is not all this at the very least, excessively mean and paltry? Does it not tend to degrade the photographic art?

Is it not a justification to any man who invents anything photographic, either to keep it himself, or take out a patent, whenever he *can* do so. If one man has shrewdness enough to adopt the novelty of a trade mark, to originate a particular expression or sketch a distinctive advertisement, ought he not to have as good a moral right to the exclusive profit and enjoyment of any such product of his wits, as the man who writes a book, paints a picture, draws a design, or takes a portrait?

And is not he, who with "design and malice aforethought," adopts such trade mark, particular expression, or salient point of such distinctive advertisement, just as deserving to be gibbeted (in print I mean), as any other person who is guilty of moral delinquencies which do not come within the grasp of the gentlemen of the long robe?

I imagine it is clearly within the province of the press to undertake this task, and that is why I ask you to insert this little castigation from yours obediently, Viverra.

PHOTOGRAPHY IN INDIA.

Sir,—In yours of the 20th May, just received, I see you want to know my methods of working in India. I cannot claim any great peculiarity; I prefer Stuart's (of Glasgow) collodion. It keeps an unlimited time, and does not go to pinholes, as nearly all others I have tried do. I generally add one grain of bromide per ounce.

Nitrate bath, forty grains per ounce; make neutral with carbonate of soda, filter, and add one drop per ounce of a weak nitric acid, containing 3·6 per cent. of pure acid by his table.

Expose fully, develop with saccharo-sulphate of iron, intensify with pyro and silver, very cautiously. I know no secrets, but I send you my formulæ.

One or two of the prints are not so well toned as I should wish, but I often have to tone in a hurry, having little time. I have found no toning solution of gold keep in India; all deposit gold to some extent: and I prefer after all, the carbonate of soda and gold made fresh. I have tried M. Davanne's normal formula; it deposits *freely*.

I enclose a portrait of myself, taken by myself, except exposure.

Developer.

Take

Proto-sulphate iron	...	...	160 grains.
Crystallized sugar	...	...	40 ,,

Dissolve in 8 ounces of the mixture of water and alcohol found necessary, and filter into one dram of glacial acid.

Intensifier.

Pyro	...	...	...	...	1 grain.
Citric acid	...	...	...		1 ,,
Nitrate of silver	...	...	...		20 grains per oz.

Float 1½ minute on 100-grain solution of silver.

Fix as usual after toning, and wash for two hours in a stream, finishing with hot and cold water alternately. If overdone and undertoned, put in a two-grain solution of cyanide for a minute, and wash well.—Yours truly,

An Inhabitant of India Extra Ganges.

P. S.—I am just leaving this station, so have not time to make more prints.

[Our correspondent's specimens are very interesting; some of them including sky, with fine studies of cloud.—Ed.]

M. DU CHAILLU A PHOTOGRAPHER.

Dear Sir,—I have just received the inclosed letter from the celebrated African traveller, M. P. B. du Chaillu. It may interest some of your readers. I may state that I had provided him with two processes, the wet collodion and the ordinary Talbotype paper process. The little box he refers to is one of Mr. Hockin's dark tents; it was most compact and well adapted for a traveller like M. du Chaillu, who could not have packages exceeding a certain weight. I may mention that all the apparatus and chemicals, were packed up in eight boxes, as nearly as possible the same size, and of a long shape. A large strap about five inches wide was fastened at both ends of the box, so that the natives might pass the strap on their forheads, and have the weight of the box on their shoulders.

M. du Chaillu will have to work under the most difficult circumstances, but no doubt with his characteristic perseverance he will succeed, although he will often be nearly suffocated by the ether evaporating in his *small box*. We shall wait with anxiety the arrival of a series of most interesting and novel views.—I remain, dear sir, yours very truly, H. Claudet.

Sir,—I should have written to you ere long, but did not wish to do so until I could tell you how I was getting along with my photography, and for several months after my arrival on the coast I could not find time to practise, for I was then very much occupied with other matters. Of late I have been practising a good deal, and after a good many experiments I have succeeded I think tolerably well, and if I had a box complete I would send them to you, and I hope you would not then be disatisfied with your pupil.

I have not yet succeeded to my liking on paper, but with a few more experiments I hope to succeed.

In a few days I am off for the interior; I have a long journey before me, and will not probably return to England before two years. I hope then to be able to shew you a fine collections of African photographs.

One does feel dreadfully hot in that little box, and sometimes I do not feel very well after practising; but I will persevere, and I think your pupil will return with a good many nice views and groups of nature.—Yours very truly,

P. B. Du Chaillu.

Fernand Vaz River, August 20th, 1864.

THE NEW PRINTING PATENT.

Sir,—The last number of the News contains an advertisement from the Directors of the United Association of Photography, stating that the exact terms of the licences to

use the patent will be announced in future advertisements. In the meanwhile the directors invite tenders from professional photographers, for the exclusive right for the town or district.

Sir, as a professional photographer, I think granting exclusive licences would be *most unfair* to photographers generally, and a serious clog to the advancement of the art. If such plan be adopted, *many* first-class photographers must necessarily be prohibited using the process, either from their position as regards pecuniary means, or failing to make the highest tender, and others of less professional abilities succeed in obtaining a licence.

I am not one of those who wish to benefit from the expensive researches of others, without paying for it. I think every one ought to be fairly renumerated for the time and expense devoted to the making of new discoveries.

I firmly believe it would be to the interest of the Company, if the directors would reconsider their decision, and grant licenses to all who may apply for them.

I believe the exclusive system would be a source of endless litigation, and probably be the means of photographers leaguing against the privileged, in cutting them in price, as the general public would not be able, or care to distinguish between Woblytype and silver printing. I had the pleasure of seeing the specimens at the Company's rooms in Regent Street last week, and thought them exceedingly beautiful; at the same time I thought much of their beauty was the result of being printed from *very* fine negatives, and the colour was everything I could desire.

In making the above remarks, I do not wish to detract from the value of the process; I am too great a lover of the art not to be pleased at one step in the right direction, and I sincerely trust I shall not be excluded in using the process.

I have offered the above remarks, hoping they may induce others, and yourself amongst the number, to protest against the *exclusive right* of using the patent—I am, sir, yours respectfully, A Young Photographer.

[In the commercial arrangements which may be made regarding the patent for the new uranium process, the Company undoubtedly have a right to do what they like with their own; the prudent exercise of that right is of course another thing. We have reason to believe from a recent conversation with Col. Stuart Wortley, that they have no wish to make arrangements which shall injuriously affect the business of individual photographers, or restrict the practice of the new process to certain persons. It is possible that if they grant district rights to individuals, it will be with a proviso that those persons shall grant rights again within that district to all professional photographers willing to enter into the arrangement. Such an arrangement would simplify the operations of the Company, by limiting the number of persons with whom they personally deal, without injuring any one. But at present no arrangements are definitely fixed.—Ed.]

Photographic Notes and Queries.

Sir,—Perceiving in your journal, a letter respecting the patent enamel process, and some remarks from two other parties, I beg to inform you, for the information of your readers, that the patent right which I have recently disposed of to Messrs. Squire & Co., was taken out by me in the year 1860, and I am at a loss to discover how those three parties who, only two years since, imitated my process, can claim to appropriate either its novelty or usefulness, which, by the numbers who are now successfully adopting it under the liberal mode introduced by Messrs. Squire & Co., is becoming generally admitted, a mode also by which the photographer's work is not only greatly improved in depth and tone, but the value of the photograph itself inestimably enhanced, from the fact of its being no longer under the injurious influences of atmospheric action, hitherto one of the greatest drawbacks to really successful photography. Just previous to my disposal of the patent right to Messrs. Squire & Co., I had received offers from several of the principal photographers for licences to work it, but Messrs. Squire & Co. suggested the liberal course of seeking remuneration only by the sale of the glass plates, already prepared, than the application of which nothing could be more simple or certain, thus very considerably averting the trouble and loss of time which photographers otherwise might have experienced.

I regret, however, to find that when a new process is practically brought before photographers, tending, as this does, to their own advantage, that there should be found those who will insist upon looking the gift-horse in the mouth. Indeed, no boon is sufficiently great to satisfy some operators.—I am, sir, yours respectfully, A. Rollason.

Peckham, October 11, 1864.

Manufacture of Chloride of Gold.

Sir,—Relative to the communication upon the subject of chloride of gold, which appeared in your last week's impression, our position as manufacturers compelled us to notice Mr. Eliot's letter; but as the photographic profession do not find any difficulty in purchasing pure chloride of gold, we do not feel bound to make our process public, and remain, sir, yours respectfully, Johnson and Sons.

[Messrs. Johnson and Sons were invited to state the nature of the impurity which they said was not removed by Mr. Eliot's mode of preparing, not to disclose any secret method of manufacture. The fact of their declining to state what that impurity is, leaves photographers at liberty to doubt its existence, and regard the insinuation of an unnamed evil as a mere bugbear, unworthy of notice.—Ed.]

Talk in the Studio.

Mr. Gladstone and the Photographer.—A project, suggested by Mr. M'Lachlan, for the formation of a photographic gallery or museum in which negatives should be preserved of the portraits of great men has been before the public on several occasions, and has been mentioned in the Manchester City Council more than once. Mr. Gladstone, on Friday, gave his assistance towards carrying out this scheme. Upon his arrival with Mrs. Gladstone at the Victoria Station in the morning he was received by the Mayor and the Town Clerk, and they were immediately driven in the Mayor's carriage to Mr. M'Lachlan's gallery, Stamp-office-buildings. Mr. Gladstone was soon placed in a position to admit of a characteristic portrait being taken, but Mr. M'Lachlan experienced a difficulty in determining upon what object to ask the Chancellor of the Exchequer to fix his attention. In the emergency he put his hand into his waiscoat pocket, drew out a sovereign, balanced it adroitly on the back of a chair, and asked Mr. Gladstone to look intently at the coin. The object was defeated by the spontaneous laughter that the act produced. Mr. Gladstone remarked that Mr. M'Lachlan had selected the best possible thing for him to look at—it was quite a bait. Mrs. Gladstone said Mr. M'Lachlan had shown that he possessed a deep knowledge of human nature. After the mirth, in which all present joined, had subsided, two or three successful negative portraits of Mr. Gladstone were taken.—*Manchester Guardian.*

Coloured Enlargements.—Madame Una Howard has recently called our attention to some very prettily coloured enlargements from card negatives, in which considerable want in the enlarged print, was very skilfully supplied by the colourist.

Dry Weather and Actinism.—Mr. Warner is anxious to know if photographers generally have felt any especial difficulties from the late prevalence of dry weather. He has been troubled not merely with bad light, but a multiplicity of singular stains, chiefly on the sky of his negatives, which, so far as he can judge, are unaccounted for by ordinary causes.

Artificial Light for Negatives.—A correspondent, Mr. J. Pescod calls our attention to the actinic character of the light from camphine, and sends us a print, the negative for which was obtained with a ten minutes' exposure with the light. The subject is a reduced copy of a page of the Photographic News, which was illuminated by the flame from an ordinary camphine lamp.

Improved Washing Machine.—Mr. G. Williams has called our attention to an improvement in his washing machine, described in our columns a short time ago. The prints are placed in a vessel resting on a perforated frame, to which an alternate rising and falling motion is given, first immersing them into water and then lifting them from it for a few minutes to drain. It is now exhibited at the North London Working Classes Industrial Exhibition, open at the Agricultural Hall, Islington, where photographers may see it in action.

Lenses, &c., for Sale.—We have to call the attention of our readers to an advertisement in another column, announcing for sale the various optical instruments forming the effects of the late Mr. Goddard, optician. Mr. Goddard was a clever man who did some service to the optics of photography. His effects are now to be sold for the benefit of his widow, who is left destitute. Our readers have now an opportunity of acquiring some useful instruments at reasonable rates, and doing an act of charity at the same time.

To Correspondents.

Carbon.—It is probable that a good many of those you name will answer well, but we can speak of having seen good results from 3, 5, and 10.

Alpha, Southampton.—The question of desirable dimensions for a studio depends much on circumstances. We should not build one less than 25 feet long, if we had the control. You will find a chapter, with full particulars on this subject in our last Year-Book, which is the only work to which we can refer you, as treating specifically of this matter.

Ignoramus.—If you only wish to have four or five photographs enlarged, it would be scarcely worth your while to incur the cost of apparatus for the purpose, as you can get either enlarged negatives made from your small ones, or you can get enlarged prints made by the solar camera. You will find in our advertising columns the names of gentlemen who undertake enlargements for photographers. If you wish to experiment yourself in this direction, you will find that the best plan will be to make an enlarged negative, first producing a transparency. We shall have in our next some particulars of an enlarging camera for this purpose, which has produced some very excellent results.

E.C.—So far as we know, there is really no such patent in existence. Possibly it is a secret process; we have not seen any of the results. We believe Mr. Atkinson, of Liverpool, has some such secret for sale.

An Old Pupil.—Pure chloride of sodium is best made by neutralizing hydrochloric acid with carbonate of soda. Common salt often contains various impurities, such as the chlorides of calcium and magnesium, and sometimes sulphate of soda. It is not easy to an inexperienced person to remove these impurities; but it may be done by repeated recrystallization. 2. If the chloride of ammonium be pure, 8 drachms of it may be dissolved in 22 drachms of cold water. 3. Albumenized paper is not so well suited for development printing as plain paper. All the solutions should be prepared according to formula for the work. You cannot succeed in developing satisfactorily a print prepared for the ordinary direct printing process. Your print has probably been acted upon by light generally also. 4. The developing solution should not be used over and over.

J. L. P.—The best mode of keeping chloride of gold ready for use, is to make a standard solution, either in water or alcohol, and then measure out the quantity from time to time required. 2. Fresh hyposulphite, means hyposulphite which has not been used; not a sample freshly made.

J. S.—We have no knowledge of such a patent; probably bogus, as you suppose.

St. Dennis.—None of the lenses you name are especially well suited for card portraits; but we should choose No. 3. If the camera to which you refer be well made the price is moderate, and it will, we imagine, suit your purpose.

J. B. B.—It is very difficult to deal with cases like yours, in which, from your description, everything should be right, but which, in practice, you find all wrong. To begin with, however, we should think of expecting a pint of nitrate solution to keep in order many days, if we excited 30 half plates in it daily. We have faith in large baths and plenty of solution. In the next place, we should try the remedy we described in the News about twelve months ago, and also in our Year-Book, of using two baths for the same plate. And if we found that the needle-like crystals occurred now, when they did not do so under like conditions a short time ago, we should change the collodion. Read our article on "Crystalline Deposit" in the sixth vol. of the News. If a bath give clean plates a few times in succession, and then, after that continue to form these crystals, it must be from one of two causes, either something has been introduced into the solution from the collodion films, or the removal of a certain amount of the silver has weakened the solution, and rendered it incapable of holding in solution something which is present. In the first case, a fresh sample of collodion would be the remedy; in the second, a larger bath, not so rapidly reduced in strength, and the treatment prescribed in the case in our former articles.

An Old Photographer.—Almost any refiner will, we presume, buy your old Daguerreotype plates. You will find the names of some in our advertising columns. This will be better than attempting to get the silver from them yourself.

W. W. S.—The developing box worked with sleeves is scarcely suitable for anything so large as 12 × 10. For this purpose, a tent is best. Hunt your name, or some of the others advertised in our columns, will answer your purpose.

X. Y. Z.—Perfectly pure dry chloride of silver is worth 4s. 1½d. per ounce, troy; but very few samples are quite pure. 2. The best plan to save the silver from the exhausted developing solutions is to reduce it with the hypo solutions, as a sulphide. A good deal of the silver is reduced from old developing solutions, without any addition, and is found as a black metallic powder at the bottom. 3. We cannot account for your failure with the acetate bath, as it is a form of toning bath most generally successful. Your water may be in fault, or your acetate of soda may be faulty; but if you are successful with your present plan you had better stick to it. 4. Gold may be precipitated from old toning baths by adding protosulphate of iron. This gives a black precipitate of metallic gold in powder. Wash this with dilute sulphuric acid, to remove the traces of iron, and reconvert into chloride of gold in the usual manner with *aqua regia*.

J. McDonald.—Much depends on circumstances. You will find our views on the form and general character of glass houses discussed more fully in our Year-Book than we can give it here. The width should be about 14 feet, and the greatest height about the same.

A Newcastle Scot.—The free use of bromide and careful lighting, are the elements upon which you must depend for getting detail into white dresses without doing injustice to the face. 2. A whole plate lens of long focus, is the best for large vignette heads; the lens you mention is probably one of short focus. To get rid of wrinkles, freckles, &c., give plenty of exposure, and use a freely bromized collodion.

Confederate.—There are many manufacturers of cases such as you describe. Mander of Birmingham, we believe, makes them.

Alfred.—We believe that you are infringing no patent, and may use the process without hesitation.

L. X. J. X.—We do not know of the prices of Mr. Johnson's panoramic camera. We believe it is scarcely yet in the market. The principles of its construction, are explained in the specification of his patent, which we published some time ago.

Tyro.—An acetate or lime toning bath may be used over and over, if proper care be used, but without care the solution will soon become inert. The prints should be well washed, and the toning solution should be filtered back into the bottle, and kept in the dark. 2. You should try the use of a smaller proportion of chloride of lime; the effect you describe is mealiness, and is due to excess of chlorine. Chalk should be used to neutralize acidity. 3. It is always better to wash the print between toning and fixing, and if there be any chance of acidity, it is well to add a little carbonate of soda to the water. 4. You may disregard the scum to which you refer, and throw it away. 5. A thorough rinsing of the prints for a few minutes, in successive changes of water, after they leave the hypo, and then eight changes, at intervals of half an hour, with boiling water to finish, ought to wash prints sufficiently. 6. You will find negative developers to suit all circumstances in our paper read some months ago before the Glasgow Society, and also in our Year-Book. 7. Keeping the plate too long in the bath will sometimes cause fog. The same bath and developer will often do for many collodions, but modifications are sometimes necessary to suit the peculiarities of special samples.

G. R. G.—Unless you have had some practice, we don't think you would gain any advantage by albumenizing your own paper. The only plan we can recommend is to get sample sheets from, say, half a dozen houses, and try them, selecting that which suits your necessities best.

C. F.—We should judge the stains to arise from the use of an imperfectly cleaned plate.

G. B. S.—As to the right of persons to patent or register their inventions, and then to make what charge they think proper for the right to use them, we can only say that every man has a right to do what he likes with his own. No one is under the necessity of using such inventions, or paying for it, without he choose, and will not without he can gain something by doing so. It is, obviously, therefore, no part of our duty to enter into an estimate of the proper charge to be made for special things. Regarding the "Diamond Cameo Portraits," there is no restriction to prevent you taking as many pictures as you please on one plate, nor as many different positions; that is not a thing which can be registered or become the property of any one person. The point which is registered in these portraits is the convex form which is given to each figure by a die, and the general configuration.

Cap. Breton.—Thanks for the admirable microscopic enlargements.

Articles on an Enlarging Camera, by Mr. Burgess; on a New Method of Colouring Photographs, by Mr. Urquhart, and others in type, are compelled to stand over until our next.

Photographs Registered during the Past Week.

Mr. Sampson, Soley, Gloucester.
Two Photographs of Rev. James Kernahan.

Mr. A. F. Lafosse, 91 Great Dueie Street, Manchester.
Photograph of Rev. George Armitage.
Photograph of Rev. James Hayes.
Photograph of Rev. H. Clarkson.
Photograph of Rev. J. Sheehan.

Messrs. Jenkins and Payne, Aylesbury, Bucks.
Four Photographs of Admiral W. H. Smyth, F.R.S.
One Photograph of Admiral W. H. Smyth and his grandson.

Mr. Joseph Rowland, Blackpool, Lancashire.
Photographic Group. The Rowland Family.

Mr. John Govon, 12 and 13 Eustace Street, Dublin.
Three Photographs of eight Members of the Society of Friends.

Mr. R. H. Dyball, 3 Lower Nottinghill Terrace.
Two Photographs of Rev. T. P. Holditch.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to Thomas Piper, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 321.—*October* 28, 1864.

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COLLODION IN PRINTING—CHEAP SOLVENTS FOR PYROXYLINE.

THE use of collodion to contain the sensitive salts to be used in producing prints on paper, is a distinctively new idea, and one which may possibly be profitably employed in other printing processes besides that recently perfected by Herr Wothly. A brief glance at some of the advantages and disadvantages attending its use may therefore be interesting to our readers.

The application of collodion itself to paper is, of course, no novelty; the exquisitely delicate surface its film possesses, and many other qualities, very early attracted attention, and numerous experiments have been made to render it available, in combination with paper, both for the purpose of producing negatives and prints; it has been applied in various ways and for various purposes; but the mode of using it has always involved the floating on, or immersion in, a nitrate bath, from which the sensitive salt was obtained by double decomposition.

The special advantage we see in the new method of using collodion arises, in the first place, from the fact that all the salts sensitive to light are combined in one vehicle, which, being spread on paper, produces at once a surface ready for exposure under a negative. In the usual printing processes, a sheet of paper containing an uncertain quantity of chloride and of an organic substance capable of combining with silver, is floated on a solution of nitrate of silver, which, after the first sheet is floated, contains an uncertain quantity of the silver salt, plus an uncertain quantity of other matter. Every sheet which is floated changes the condition of the solution, and it is only by observation and the exercise of judgment, that uniformly good results can be obtained. Skilful and careful printers do produce good, and, we believe, tolerably permanent pictures, but the process is in its nature an imperfect and unsatisfactory one. When the sensitive salts are all combined in one inert vehicle, no such protean conditions exist; every specific portion of the vehicle used contains a definite proportion of the salts, and the stock from which it is used is not impoverished or changed in any respect. There is no interchange of parts going forward at each step of the process. The last sheet coated from a bottle of the preparation contains on its surface the sensitive salts mixed in the same proportions as the first. There is nothing, therefore, to prevent absolute uniformity of result. A valuable principle, it appears to us, is here embodied, which may be of value in other modes of printing.

A question which very naturally arises at once is: Can this principle be rendered available in silver printing? It must be quite clear to the most sanguine admirers of the new process, that for many purposes silver printing will continue to be used for some time at least, and this question may therefore be worth some consideration. We think that it is very probable that collodion may, in some cases, be used for silver printing with great advantage. Chloride of silver is not soluble in alcohol or ether, nevertheless, it may be held in suspension in collodion. We have recently tried some experiments in this direction which furnish suggestive results. In an ounce of collodion we dissolved about six grains of nitrate of silver, and having dissolved two grains of chloride of sodium in a few drops of distilled water, we added this carefully, a drop at a time, shaking the bottle between each addition. The result was something like an emulsion of chloride of silver in collodion. The particles of chloride appeared to be so infinitessimally small, that they remained in a state of suspension, giving a homogeneous, opalescent preparation, which showed no tendency to precipitation at the end of a fortnight. Paper coated with this, and exposed to light, darkened, giving an even purple tint.

It was not very sensitive, nor did it bronze by long exposure; but this was, we apprehend, due rather to the small quantity of the salts used, and some inexactitude in their due proportions, rather than to the vehicle in which they were formed. This difficulty is one which might therefore be easily remedied by the use of a larger quantity of the salts, and observing especial care in adding the proportions so as to secure the presence of a certain amount of free nitrate.

The sample of collodion we used contained an excess of ether, whilst for the purpose in question a sample containing very little ether would be desirable. Ordinary rectified spirit will, we believe, dissolve about fifteen grains of nitrate of silver to the ounce; and a collodion containing this proportion, it is probable would give much better results.* The chloride employed might be one soluble in alcohol, which would render it unnecessary to employ the additional few drops of water necessary to dissolve chloride of sodium or of ammonium.

We do not propose this as a substitute for the present process of printing on albumenized paper; but it may furnish to the amateur a ready mode of proving a negative without all the trouble of cleaning or dusting dishes, filtering solutions, &c., necessary in his ordinary preparations for printing. A bottle of this preparation might be kept ready for use, and a sheet of paper coated and made ready for the pressure frame at a minute's notice.

But there is another purpose for which collodion in printing probably may be made useful to the professional

* To dissolve nitrate of silver in collodion requires a little care. The best plan is as follows:—Place the silver to be dissolved in a clean mortar with a few drops of water, and pound it into a paste; then add a little rectified spirit, and rub the whole well together in the mortar, adding spirit until the whole is dissolved. The aim is here to make as strong a solution as possible, and no certain amount can at present be given, as a number of experiments would be necessary to determine the proportion of nitrate of silver which spirits of different strengths may be made to dissolve. But by weighing the nitrate first, and then measuring the solution as it is added to the collodion, it will be easy to ascertain the quantity added.

printer; we refer to its employment in solar camera and development printing. Hitherto, plain paper has been chiefly used for development printing. Albumenized paper has not generally been found suitable for the purpose. Various plans have been suggested and tried with varying degrees of success for keeping the image on the surface, and so preserving vigour and avoiding the dull heavy effect of an image which is all in the texture of the paper instead on the surface. It appears to us that the use of collodion will in all probability, remove all difficulties. A collodion prepared as we have described with any mixture which might be found desirable of either iodides, bromides, or chlorides. Paper coated with this preparation would preserve the image on the surface, and would materially facilitate the manipulations generally. It would after exposure be, of course, dealt with in the usual manner in development, fixing and washing.

To the taste of many the texture of surface given by collodion will be a great recommendation. By a little variation in the preparation and manipulation, almost any kind of surface may be secured, from that resembling plain paper—a little finer, but not more glossy—to that of the most highly albumenized or enamelled paper. So much for the advantages.

What then are the disadvantages? These, it may be alleged, are threefold: first, the difficulty of coating large surfaces evenly; second, the rapid evaporation, which not only increases that difficulty, but makes the operation an unpleasant and dangerous one, from the fumes of ether; and third, the great cost of collodion.

The first difficulty is one of manipulation, which may be very easily overcome with practice. The second and the third appear more formidable, but we believe by no means insurmountable, and the remedy we intend to suggest deals largely with both objections at once.

Collodion is generally described as a solution of pyroxyline in ether and alcohol; but it is by no means necessarily that. There are other solvents of pyroxyline besides ether, or ether and alcohol: possibly many; but we know one which is very much to the purpose. Pyroxylic spirit, or common wood naphtha, is an excellent solvent for pyroxyline, better in fact than ether. This fact was first published, we believe, by Mr. Spiller, nearly ten years ago; and but for the apprehension felt in some quarters of the danger to the nitrate baths from methyllic compounds, might possibly have been utilized before now. The common samples of wood naphtha are, it is true, sufficiently uninviting in odour to render their use by no means desirable, if they could be dispensed with. We have recently been making some experiments, however, and find that in a highly rectified sample of naphtha, this unpleasant smell is comparatively absent. But here another difficulty arose. A highly rectified sample of wood naphtha costs twice as much per gallon as methylated alcohol, and though it would still prove a cheap solvent, it would not render the collodion as cheap as it is desirable it should be for printing purposes. It then occurred to us to use the naphtha, not as the sole solvent, but in conjunction with alcohol, making the naphtha, in fact, take the place of the ether. This we found to answer perfectly, giving readily a clear satisfactory solution.

There is another noteworthy fact in connection with this experiment. We were a little surprised to find that the collodion made from naphtha alone gave a film which dried white or opaque or opalescent, powdery, and wanting in coherence, instead of being clear, glassy, and tenacious. We then tried in succession two or three other samples of pyroxyline, all of which yielded similar results. We still, however, felt disposed to attribute this defect to the cottou rather than the solvent; on referring, however, to Mr. Spiller's experiments, we find that he notes a similar tendency, partially removed by the use of a specially prepared sample of anhydrous naphtha, but still remaining to some degree. On making a sample of collodion, however, from naphtha and alcohol, we found this tendency disappear, and the film was, in all respects, satisfactory. We noticed another singular fact in connectiou with these experiments: in one case we added pyroxyline at the rate of about twenty grains to the ounce to collodion: this was dissolved by naphtha perfectly, but gave the powdery white film. On adding alcohol sufficient to reduce it to five or six grains to the ounce, it became slightly turbid, and finally gave a considerable amount of deposit; but the film was clear and tenacious.

We think then that, by the method we propose, a collodion may be produced which will answer every purpose. It will be very cheap, especially if some of the less expensive modes of making pyroxyline be found to answer in conjunction with it. The price need only be a fraction of the price of pure negative collodion. It will not rapidly evaporate either to hurt the manipulator, or alter the thickness of the collodion. Where ether is employed in conjunction with alcohol, the ether being the more volatile, rapidly evaporates, and changes the physical constitution of the collodion. Naphtha and alcohol are, however, very much alike in their respective degress of volatility, and evaporation, besides being slow, will proceed in about equal ratio with each material.

There are other purposes for which a cheap form of collodion may probably be found valuable, as, for instance, in carbon printing, enamelling prints, &c. For any of these or similar purposes, we commend the preparation we have described.

PHOTOGRAPHY IN THE DUBLIN INTERNATIONAL EXHIBITION OF 1865.

It may already be known to some of our readers that an International Exhibition of Fine Arts and Manufactures will be held in Dublin in the course of next year, opening in May and closing in October. We are happy to state, in regard to Photography in that Exhibition, that there is every probability that it will occupy a more important and more honourable position than it has yet ever done in any similar exhibition in the United Kingdom. We have no wish to recall the mortifying position of our art in the Exhibition of 1862: we would willingly let its memory drop, and we only now refer to it to express our conviction that in regard to photography the management of the Exhibition of 1865 will be in all respects the antithesis of that of 1862. We have pleasure in stating that the general direction of that department is placed in the hands of a gentleman in every respect pre-eminently well fitted, as an old photographer and enthusiastic lover of the art, as well as by other qualifications, to undertake its satisfactory management, we refer to Sir Jocelyn Coghill, Bart., and we have but to invoke the cordial co-operation of photographers, we trust, to secure a complete success.

The Exhibition will be held in the Dublin Exhibition Palace, which is situated in ornamental pleasure grounds in the City of Dublin, and possesses rooms especially designed as picture galleries. Photographs are to be classified as Fine Arts, and thus take position in the best part of the Exhibition.

We have only space at present briefly to indicate the general character and intention of the Exhibition, and bespeak for the photographic department the interest of every photographer, professional and amateur, in securing a creditable and successful issue. We may add that the undertaking has secured the sanction and aid of Government and the cordial support of the Society of Arts; its general prospects being in all things auspicious. We now subjoin the regulations for the guidance of photographers, and call attention to a communication from Sir J. J. Coghill on another page, referring to the matter; we may also add that from a private letter we learn his deep interest in making this department in every way worthy of photography, and of placing on record a creditable and authentic record of the present position of the art.

Special Regulations applicable to the Photographic Department.

1. All kinds of photographs are eligible for exhibition, subject to the 12th general rule.* (See Prospectus.)

2. All photographs sent for exhibition must be framed and glazed, except in the case of life-sized photographs coloured in oils, which need not be glazed.

3. Each photographic picture, or frame of pictures, must have a descriptive label pasted on the back, detailing the subject and process. It must also state the name of the photographer or exhibitor, his address, the nation in which group it is to be exhibited, and if for sale, the price; and a similar label must be pasted on the bottom of the rough packing-case for convenience in repacking.

4. All photographs that have been "touched," coloured, or stippled, must have the fact notified on the descriptive label but such "touching" as may be necessary to conceal slight flaws in a negative will not be considered as falling within the rule.

5. No apparatus can be admitted into the Photographic Gallery except for the purpose of exhibiting photographs, and then only with special permission of the Committee.

6. Photographic apparatus will be exhibited in the "Philosophical" group, and photographic chemicals with "Chemicals;" but exhibitors will be permitted to illustrate the peculiar merits of such articles by photographs placed in their vicinity, subject to necessary restrictions as to number, size, merit, &c.

7. With the exception mentioned in the foregoing rule, all photographs will be exhibited together, but every care will be taken to group the various nationalities in as well defined subsections as possible.

THE "QUARTERLY REVIEW" ON PHOTOGRAPHY.

The *Quarterly Review*, just issued, has an admirably complete and appreciative article on the subject of photography. It is now seven years since the *Quarterly* reviewed the position of photography, and few persons interested in the art will have forgotten the eloquent and charming article, attributed to the pen of Lady Eastlake, which then appeared. It is pleasant to think that, whilst the smaller fry of the press have often felt it clever and safe to sneer at photography, and especially at its art claims, the leviathans can afford to be just, and we have here an article as full of enthusiastic appreciation of photography in all its aspects as it is accurate in detail and exhaustive in treatment.

We subjoin an extract from the opening of the article:—

Of all the marvellous discoveries which have marked the last hundred years, photography is entitled, in many respects, to take its rank among the most remarkable. It will not produce the same wide-spread effects upon the social condition of the human race, that have been and will be the result of the steam-engine and the electric telegraph. It will not bring any such mitigation to human suffering as has been caused by the discovery of chloroform. But it occupies a position distinct from these in the perfect novelty of its results, and their more direct connection with the world of mind. It is not merely an improved mode of doing that which was done before. Carriages were drawn, and shuttles thrown, and signals sent from distant points, before ever Watt or Wheatstone were heard of But the work which Wedgwood and Boulton are supposed to have begun, and which Talbot and Archer perfected, has done a new thing. It has forced the sun, which reveals to our senses every object around us, to write down his record in enduring characters, so that those who are far away or those who are yet unborn may read it. It has furnished to mankind a new kind of vision, that can penetrate into the distant or the past—a retina, as faithful as that of the natural eye, but whose impressions do not perish with the wave of light that gave them birth. Photographs regarded as evidence of that which they represent, differ in essence from any other species of representation that has ever been attempted. They are free, so far as their outlines are concerned, from the deceptive, and therefore vitiating element of human agency. The work of the artist may be more beautiful, but it can never be so exact. Philosophers have pleased themselves with the fancy that the scenes that passed upon this earth thousands of years ago have not really perished; but that the waves of light which left the earth then are still vibrating in the illimitable distances of space, and might even now be striking, in some far-off fixed star, an eye sensitive enough to discern them. Supposing that photographs are preserved with reasonable care, the philosophic dream may be a reality to our remote posterity. Lord Macaulay's New Zealander, when he goes home from his perilous exploration of Great Britain, may gaze in some Antipodean Museum upon a picture of the entry of the Princess Alexandra into London, traced, not by some careless or courtly human hand, but by the very rays of light which were reflected from her face, and from the various persons and objects around her.

Though it cannot be said that this wonderful art has any want of social consideration to complain of, its nature and processes are too new to be familiar, except to those who have made them the subject of special study. There is an inner photographic world in which photography is pursued with an earnestness which far transcends mere professional zeal, and has something in it of the enthusiasm of the devotee. As a profession the pursuit of it has already attained very large proportions. There is scarcely a family of any class in the United Kingdom in which the likeness of well-loved features, guaranteed by the infallible sun, is not duly prized; and the enormous demand has created a corresponding supply. There is scarcely an educated lady, fashionable or unfashionable, whose table is not adorned with the album of cartes de visite, containing a full allowance of royalties, half-a-dozen leading statesmen, and a goodly row of particular friends—all highly useful in furnishing subjects of conversation to guests "gravelled for lack of matter." There is hardly a cottage in which a humble sixpenny "positive" does not recall, somewhat duskily perhaps, but still truthfully, the lineaments of some distant son or brother. To meet this demand a whole army of professional photographers has sprung into existence, working with very various skill, and in very different social positions—from the few celebrated artists in the great capitals, one or two of whom are said to be in the receipt of incomes far exceeding that of the Archbishop of Canterbury, down to the travelling photographer in a covered cart, who may be found in the remotest villages of Scotland or Cornwall, and whose gains may probably be described in the most modest possible terms. By the side of this professional class, has arisen, not so widely of course, but still with remarkable rapidity, a very zealous body of amateur artists. A number of photographic societies exist, composed in some cases of amateurs and professionals conjointly, in others entirely of amateurs. The chief of these societies is honoured by the presidency of no less a personage than the Lord Chief Baron of the Exchequer; on the committee of another figures the name of the Primate of England; and the other less learned professions are not less fully represented. Three or four photographic newspapers, conducted for the most part with great ability, complete what may be called the social apparatus of the art.

An admirably clear, exact, and vivid description of processes and principles, to which we shall probably return, follows. We have next the following interesting remarks on one of the applications of photography:—

In judicial inquiries, not less than in scientific experiments or investigations, its incorruptible and infallible accuracy gives to its productions a value to which no work of human pen or pencil can even distantly approach. Governments have not failed to make use of it for purposes of criminal police. In some countries every person convicted of any crime is photographed, and the record of his features, duly multiplied, becomes part of the archives of every prison. Of course a hardened criminal, knowing the purpose for which his likeness is being taken, is not a very manageable sitter. But no choice is given him: the room in which he is brought before the chief authority of the prison is so arranged, that he is obliged to stand in a place where a good light falls upon him; and while he is being professedly examined, the concealed photographer does his work. The system has been introduced to some extent in England, but only very partially. It is to be regretted that the adoption of it has not been more general. The cost is quite trivial; and there is no other plan, approaching to it in efficiency

* By this rule the Committee have power to exclude unsuitable contributions.

for drawing that clear and certain line between new and old offenders, which is absolutely essential to a sound criminal system. If every prison were armed with its photographic album, containing a pleasing collection of all the physiognomies which had ever been shorn of their flowing locks in any gaol in the country, a ruffian out upon his third ticket-of-leave would not be able, as now, by the simple expedient of changing the field of his operations after every fresh conviction, to persuade the magistrates that he was an innocent, accidentally led away by drink. The plan has received the sanction of the Committee of the House of Lords upon Prison Discipline, which was presided over by Lord Carnarvon; and under the auspices of the same noble Lord has been introduced into Winchester Gaol. It can never attain to its full utility until it has been universally adopted; and therefore it is to be hoped that the magistrates of those counties which have not yet adopted it may be induced to do so by the recommendation of the Committee of the House of Lords.

But this is not the only service which photography is capable of rendering to the law. If Müller had never in an evil hour entered a photographer's studio, the link would have been wanting which so immediately connected him with the foreigner who entered Mr. Death's shop—pursuit might possibly have been delayed until it was too late—and he might have been by this time distinguishing himself as a rising Federal officer under the command of General Butler. An amusing instance of a similar kind, though in connection with a less atrocious crime, occurred the other day. A thief bethought himself that it would be a good speculation in his way of business to steal one of a photographer's lenses, a kind of booty which would pay as well as a couple of dozen spoons. Accordingly, he went in to have his portrait taken, duly sat for it, and when the photographer retired to develop the plate, he walked off with his plunder in his pocket. Unluckily, he had not reflected upon the consequences of the few seconds he had spent in front of the lens he coveted. The photographer had obtained a good likeness of him, and the means of identifying him were, of course, speedily placed in the hands of the police. An incident of the same kind plays an important part in the drama of the "Octoroon," which was so popular in London two or three years ago. The author, however, shows the popular ignorance upon the details of photographic manipulation. The culprit is detected in consequence of his accidentally committing his crime in front of a camera and lens, which a photographer had accidentally left there. The author apparently entertained the view that in all places and under all circumstances a camera and lens would take a picture of what passed before them, without the intervention of any sort of human agency.

We shall return to this article in our next.

THE SUPPLY AND PREPARATION OF URANIUM.

The probable greatly increased demand for the metal uranium as the chief agent in the new printing process, has excited in some quarters expressed doubts as to the possibility of meeting the demand, and it has been stated that but a single ton of pitchblende, the source of uranium, was in the market. We have already expressed a conviction that as enterprise and research were stimulated a supply sufficient to meet the demands would be found. We have since been informed that the Association of Photography have already received a contract from one person to supply them with ten tons per annum.

As to the preparation of the metal, the following communication we have just received from Sir J. F. W. Herschel will be read with interest.

Sir,—The introduction of the Wothlytype process into commercial photography, appearing likely to lead, not only to a great consumption of uranium for the process itself, but to an increased diligence of enquiry into the photographic habitudes of that metal, it may not be amiss to recall to the attention of experimenters, who may wish to prepare the metal for their own use, from specimens of its ores in their possession, an exceedingly simple, cheap, and ready mode of obtaining it in a state of extreme purity, so far as contamination by any other metal is concerned, described by me in the *Annales de Chimie*, for March, 1832.

It is as follows:—Having formed an acid solution, containing uranium, iron, and the other metals usually associated with it, precipitate by ferro-cyanide of potassium (the *yellow* prussiate); wash the precipitate well with cold water, by subsidence and decantation, not by filtration (to prevent aggregation of the precipitate). Redissolve by carbonate of potash, filtering off any undissolved oxides, and add caustic potash to the filtered liquid. The oxide of uranium separates, of a beautiful yellow colour, and after washing is free from all metallic contamination, though it retains in combination a little potash. If phosphoric acid be present, as is often the case in uranium ores, it will be of course retained in the liquid.—Your obedient servant,

J. F. W. Herschel.

Collingwood, October 22, 1864.

TESTING THE NEW URANIUM PRINTS.

A suggestion having been made that the uranium prints remaining uninjured by reagents which destroyed silver prints, was due to the protecting influence of the film of collodion rather than to the stability of the material forming the image, Col. Stuart Wortley informs us that he has repeated the experiments in a manner which exposed the prints to the full action of the tests without any protection from the collodion, and with precisely the results we have already described, indicating satisfactorily the intrinsic permanency of the prints.

But even if the stability had been due to the collodion, we apprehend that this would in no wise have militated against the permanency of the prints, inasmuch as collodion is the vehicle to be employed. The thing desired is permanency, whether it be obtained by the nature of the chemicals employed, or to the vehicle in which they are used—whether it be due to uranium or collodion—if that be obtained, the great end is secured.

WAXING PHOTOGRAPHS.

In referring to the enamelling of photographs, we have remarked that for large pictures the highly glazed surface conferred, was not in our estimation an advantage; but that, on the contrary, it tended materially to destroy certain art qualities, which are associated with texture or quality of surface in monochrome pictures. The transparency and detail in shadows which the print possesses whilst wet, and loses when dry, is not, however, less desirable in large pictures than in the very smallest: and although it is difficult to restore this entirely without giving a varnished surface, it is possible to do so in a very large degree, and this is effected by waxing. Our attention was re-directed to this subject recently, by Mr. Thurston Thompson, the skilful protographer to South Kensington Museum, who stated that he had not passed a print out of his hands for many years without submitting it to this process, for the double purpose of giving depth, detail, and transparency to the shadows, and aiding in the preservation and permanency of the photograph.

His mode of proceeding is as follows:—An ounce of pure white wax is dissolved in an earthenware vessel, and an ounce of turpentine is then stirred in and mixed with it. This is the waxing preparation ready for use. A portion of this is rubbed with a clean rag on to the surface of an unmounted print, on either plain or albumenized paper. A brush with a flat surface, with the bristles tolerably closely set, one really manufactured for a clothes brush, is then applied, and the wax brushed briskly over the surface of the print, until it is evenly distributed, and has, in point of fact, disappeared, and a finishing rub is given to the surface with a clean rag.

No additional glaze is given by this operation, but a result is applied something like the effect of a varnish in giving transparency and bringing out detail in the shadows;

detail which was before hid, now "bears out," as a painter would say, in all its minute delicacy, and the general effect of the print is very materially improved. On plain paper a little extra care is required to avoid making the surface patchy or uneven; but the print is marvellously improved by the process. Both plain and albumenized prints are, moreover, better preserved from any deteriorating influence by the minute coating of wax given to the surface. Any little smear of paste which the surface of the print may acquire when mounting, is much more easily removed when the print has been waxed, as the print may then be sponged without any danger of injuring the surface.

It has been objected, that turpentine has always a tendency to turn yellow, and that the prints to which it has been applied in conjunction with the wax will necessarily discolour in course of time. Theoretically, this is, doubtless, true; but, practically, the quantity is so small that we doubt if it would leave any perceptible defect in this direction. In order to avoid any chance of this kind, however, there are several other solvents of wax which may be used, such as benzole, ether, chloroform, and the essential oils. We have in our own experiments generally used the oil of rosemary or of lavender, either of which answers perfectly.

TRANSPARENT COLOURS FOR PHOTOGRAPHY.

Repeated attention has been called of late to the use of colours used in dying textile fabrics in place of pigments for tinting photographs. Amongst others Dr. Jacobsen has recently called attention to the especial advantages possessed by the aniline colours applied to this purpose. Our esteemed confrère and contributor, Dr. Hermann Vogel, forwards us an example of the mode of tinting thus recommended, which is very effective. We recently received an interesting communication from Mr. A. Urquhart, of Grantown, Strathspey, accompanied by a parcel of photographic landscapes coloured with much taste; the method employed being expeditious and simple, consisting simply in the use of the colours commonly used in dying. An extract from Mr. Urquhart's letter will best give his mode of proceeding:—

"As I have very little time, the photographs I send you were each coloured in about twenty minutes, so I can give no fine results. I wish only to call your attention to the colours, as being suitable for this purpose. Dyes are what I think should be used, although I have but little knowledge of them. In colouring the prints I send you, I employed one penny bottle of Lood's blue fluid, a sixpenny bottle of majenta dye, and some yellow wood boiled. These are the only colours I have at present, so I could not produce many effects. The albumen on the paper has an affinity for dye, and takes it in. The dye will pass through the paper if kept on long, and will not easily wash out. Hyposulphite of soda has no effect on the dye. Finished prints can be dyed to any tint all over, and any body of colour put on.

"Process.—In colouring the prints sent you, I proceeded as follows: The prints were finished in the usual way, but not mounted; put in a basin of water five or ten minutes, and then laid on a piece of glass and the surface dried with a cloth or blotting paper, and the dyes applied with a camel-hair pencil. When the tint desired is obtained, I wash, and dry, and then apply the next tint, and so on, washing between applying each tint.

"The dyes work in every respect like water colours, but leave no mark on the albumen. Touching up can be done on the card, or the face of a figure could be finished with water colour as practised at present.

"Fruit and flowers photographed and coloured with good dyes, must be fine. Dye-coloured photographs could be varnished with oil varnish, as the colours are not moved by water or size.

"Dye-coloured stereoscopic views are very beautiful; the dye being so much finer than any paint.

"Untoned prints, if coloured in this way, look as well as toned ones. Prints intended to be coloured, should not be toned dark, the brown prints colour most natural. White parts could be protected from this dye by a touch of gum and cream of tartar, or the dye could be removed altogether by a preparation of lime used in dye works, and fixed more securely by a solution of alum.

"All I have said may not be news to you, but I never saw or heard of any dye-painted photographs, and thinking it might benefit photographers, I make this communication; if any good arises out of it, I shall be very much gratified.

"Yours respectfully, A. Urquhart."

The specimens forwarded are very pleasing indeed; the colouring is applied in a broad style, which is very effective, and to persons with artistic taste will be very simple and easy.

COPYING.

BY OSCAR G. MASON.*

Although much has been already published upon the subject of photographic copying, there is undoubtedly yet much room for improvement. In that particular branch of our art, many or all of the profession have much to learn, and much already learned has yet to be brought into practice, as a few very simple proofs will demonstrate.

A photographer in a small country town is requested to make a 12 by 15, or 14 by 17 copy of some small daguerreotype, ambrotype, or card picture; but having on only ¼ or ½ size combination lenses for his ordinary portrait work, he feels compelled to decline an order for such an unusual size as 12 by 15 or larger, and consequently sends one of his best customers away with the idea that he cannot get his copy made in the country.

The photographer has told him that "such orders come in so seldom," that he could not afford to keep the necessary instruments for executing them. Now this humble disciple of Daguerre did not think or know that his ¼ or ½ size was sufficient for his purpose; and that very likely the city photographer, who might receive the order which he refused, would use no larger or more complicated apparatus than he had in his own unpretending gallery.

Or, some patron wishes a large photographic copy of a daguerreotype, in which the sitter is reversed, the right appearing the left, and *vice versâ*. He wishes the large copy reversed from the original picture, so that the parting of the hair, or any peculiar marks of the features, may appear in their natural position, but our photographer tells him that it is impossible; or, perhaps, that in order to produce such a metamorphosis, he will be obliged to make a copy, and then copy from that again, instead of finishing the first copy from the original—thus losing much of the finer definition.

He has forgotten, or did not know, that by the use of a reflector properly arranged, or a re-copy by transmitted light in an improvised solar camera, he might retain the work of his would-be patron, and in the same do himself credit, and retain the profit which otherwise goes into the hands of another, who uses perhaps the same means which he had under his command. Or, if he has thought of all these disadvantages, and uses them, perhaps the original may have been made in the early days of the art, when the daguerreotypists' buffs were not made of the finest chamois and filled with the finest of rouge, and he sees that the polish of the plate was *not* such as to give the "invisible surface," but rather that the surface is very visible on account of the many scratches which cross it in the direction of the last buffing, which scratches persist in appearing provokingly plain in his enlarged copy.

His customer is dissatisfied, and does not seem to give credit to the statement "that it cannot be helped." Again the photographer has forgotten that a smooth copy might

* From the *American Journal of Photography.*

have been made by having the light strike the original at a less acute angle with the buff marks, and he is surprised and chagrined by having a fine city copy shown him from the same plate a few days after his statement of the impossibility of such a production.

Many daguerreotypes, after laying several years, have become changed, the surface of the plate being slightly oxidised by the slow action of the atmosphere. After a picture has been so clouded or stained, it is necessary to remove the veil or stains before a good copy can be made. The usual method, by the use of a weak solution of cyanuret of potash, will not invariably produce the desired renovation. In a certain stage of the daguerreotype process the plate after being gilded is often left in such a condition that neither water, alcohol, or cyanuret of potash solution will flow evenly over the surface.

In the early days of the art, the writer was often annoyed and perplexed by such condition of pictures handed in for copying, until by accident he found a sure and simple, though novel solvent, for the oily-like film which was so impervious to the attack of all previously tried solvents. The remedy is, cover the plate with saliva, and the action is immediate and effective, and without the least injury to the most delicate daguerreotype. After the plate has been so treated, the saliva is washed away with water, which then flows freely over the whole surface, after which the oxidisation may be removed by the diluted solution of cyanuret of potash.

Another source of perplexity which the unexperienced copyist meets with is, the imperfect reflection produced by the convexity or concavity of the plate on which the daguerreotype is made. This can be avoided only by straightening the plate, which must be done with great care, avoiding all contact with the surface of the picture.

For the production of the finest copies of daguerreotypes and other pictures upon metal or glass, light should fall upon the original from *one direction only*. The writer has found his greatest success in the use of a direct or reflected light through a side window. Of course, experience teaches every one in the profession that a picture must be parallel to the camera in order to produce the best results, this is very easily effected by the following described method:—

A smooth flat board, of sufficient width for the copying camera; to the edges of this board fasten thin strips, to project about one-half inch above its upper surface, for the purpose of keeping the camera parallel with the board, and at the same time allow of its being easily moved back and forward.

A piece of board about ten inches long, and of sufficient width to fill the space between the long or copying board, is provided with an upright piece of the same width and about fifteen inches long, so that the two, when fastened together, form an L. On the face of this fifteen-inch upright of the L are fastened two bevelled strips of wood, so that a second upright piece of board, nearly as wide as the other, may easily slide up and down, and be retained in its place by thumb-screw through the back of the upright part of the L, thus the perpendicular motion is obtained.

With the two motions thus arranged, it is evident that any point of height or lateral motion may be given to the picture which is being copied. But to obtain the right position in the most convenient way and least time,—after fastening the picture to the front board, the camera may be slid forward until the tube is near the face of the picture, which can then be raised, lowered, or moved to the right or left, as may be required. The picture is thus kept exactly true in a right angle to the axis of the lens, and the whole can be placed on a table or stand near the window, or laid aside when not in use.

The writer has found it to be a very efficient and simple arrangement, which answers most admirably the purpose, and would save much time and perplexity were it generally adopted, instead of trying to get the picture in position for copying without some similar arrangement. It is so simple that any cabinet maker, house joiner, or carpenter, could easily construct one in a few hours and at a trifling expense.

For making copies of large pictures, such as paintings, engravings, or drawings in sections, a description may be given in a subsequent article.

DRY COLLODION.

BY DR. SCHNAUSS.

1. *Preparation of the Collodion.*—Every kind of *good* pyroxyline may be employed in this process.

Fill a large bottle two-thirds full of carded pyroxyline, then pour on to it a little alcohol, sp. gr. 0·835, and shake it. The pyroxyline loses much of its bulk; we then add sufficient ether to fill the bottle two-thirds, and then sufficient alcohol to fill it completely. Shake the bottle well, and leave to settle for several weeks. The clear supernatant liquid is then diluted, by mixing one part, by measure, of this collodion, with one part of ether and one part of absolute alcohol. In summer, take a little less ether, and a little more alcohol. After shaking vigorously, prove the density of the mixture, by pouring a little upon a clear glass plate. The film must not be too thin, but the liquid must flow without streaks. If it is not thick enough, add a sufficient quantity of pyroxyline.

2. *Iodizing Solution.*—This is prepared as follows:—

Dissolve in alcohol sp. gr. 0·835 ...		40 parts
Iodide of ammonium ...	...	4 „
Iodide of cadmium ...	...	2 „
Bromide of cadmium ...	...	1 part

This solution must be prepared eight days before it is required for use. Filtered through paper moistened with alcohol, and add as much of it to the collodion as will give a white film when put into the sensitizing bath. The iodized collodion must be left two or three days to settle; it then becomes very clear, and of a light yellow colour.

3. *Nitrate of Silver Bath.*—This bath is composed of

Nitrate of silver ...	...	1 ounce.
Distilled water ...	...	12 ounces.

to which 10 or 15 drops of the iodizing solution is added. Shake the mixture, and leave it for some hours exposed to the sun's rays. Then take a negative with the collodion, the sensitizing bath, and the pyrogallic acid, or commercial sulphate of iron developer, to make sure of their efficacy. If the picture develops vigorously without fogging, the solutions are in good condition; if it does not, then add a few drops of acetic acid to the sensitizing bath.

4. *The Alkaline Developer.*—We require the following solutions:—*a. Dilute alcohol*; 6 ounces of alcohol mixed with 10 ounces of distilled water. *b. Ammoniacal solution*; dissolve 1 drachm of carbonate of ammonia in 6 ounces of the above diluted alcohol. *c. Pyrogallic acid solution*; dissolve 1 drachm of pyrogallic acid in 15 drachms of absolute alcohol. This solution will keep a long time; it becomes red, but deposits no precipitate. The aqueous solution, on the contrary, will keep only one or two days. It is prepared by—*d*—mixing 1 drachm of diluted alcohol *(a)*, with 25 drops of the pyrogallic acid solution *(c)*.

5. *Intensifying Solutions.*—These solutions may consist of the ordinary mixture of pyrogallic acid and silver solution; but where the modification of the light, and the change in the duration of the exposure, are so little under control, it is preferable to have ready also a freshly prepared solution of citric acid, to be added to the pyrogallic intensifier in case the negative should come out too quickly and energetically. Citric acid, too, may be added to the silver solution, and the precipitate dissolved by a drop or two of dilute nitric acid. By this means the operation of intensifying is brought more within control, the shadows become clearer, and the light, stronger.

* *Le Moniteur de la Photographie.*

Other methods of Development.—The alkaline developer is especially adapted for winter use; but in summer the same advantage can be obtained more easily as follows:—

Pyrogallic acid	... 10 grains
Distilled water	... 10 ounces
Formic acid	... 2 drachms
Alcohol	... ½ minim.

The plate is previously flowed with the "dilute alcoholic solution" (*a*), then again washed until the surface appear *uniform'y* moist, it is then flowed with the pyrogallic acid, which, after awhile, is poured back into the developing glass, containing a few drops of citro-nitrate of silver; the mixture being well shaken is again poured over the plate.

The double sulphate of iron and ammonia with acetic acid, may sometimes be used with advantage in the development of dry plates, and especially so, if a smaller quantity of citric acid and alcohol be used instead of the acetic acid. Iron developers, however, must not be poured upon the plates before the silver solution, as is the custom with the pyrogallic acid developers. After the plate has been moistened either with water, or with dilute alcohol, in which latter case the alcoholic solution is well washed off, it is immersed for a few seconds in a silver bath slightly acid, then well drained, and the iron solution poured on.

6. *Preservative.*—One ounce of large raisins are boiled in ten ounces of distilled water, the solution is then put aside to cool, and then filtered. A few drops of acetic acid will make it keep better.

7. *Gelatine Film on the Prepared Plates.*—The use of gelatine wastes much time, and is altogether unnecessary; it is intended to prevent the collodion film from slipping off the plate in the subsequent operations, a result which often easily happens with all the dry processes. This, however, may be overcome by roughening the edges of the plate on a grindstone, or by varnishing the edges of the dry collodion film after exposure; it may also be diminished by carefully cleaning the plates, by a good condition of the collodion, and by covering the surface before development with dilute alcohol. If gelatine be used, it is prepared by first soaking four grains of gelatine in two ounces of water, and then dissolving by heat. When cold, about a drachm of alcohol is added, and the solution is filtered. The gelatine sometimes does not easily flow over the plate, in which case the latter is held over a vessel containing hot water, and, when warm, the gelatine is poured quickly over it, and spread uniformly by means of a glass rod. Sometimes, and this is especially the case when the edges are not throughly cleaned, the gelatine is repelled from these parts, and the plates have to be cleaned over again.

Manipulations.—The coating of the plates with collodion, and the sensitizing operation, are the same as in the wet process. The plates are afterwards placed collodion side upwards in a large clean vessel of distilled water, and frequently moved. At the end of five minutes each one is taken out, well drained, and then flowed three times in succession with fresh portions of the raisin solution, which must be kept carefully in motion so as to cover the whole of the plate equally. After which, the plate is allowed to drain thoroughly, and then put away to dry in a perfectly dark place, completely dry, and free from dust. Drying by artificial heat is not recommended.

The principal cause of the want of success in dry-plate photography, is to be attributed, in my opinion, to the numerous manipulations they have to go through, as, for instance, the number of times they have to be washed, and secondly, to the length of time between the exposure and the development. These give rise to numerous invisible sources of defects. A trace of any reducing agent in the dish, in the water itself, or in the air of the developing room, is quite sufficient to produce all manner of fogging and stains. It is necessary, on this account, that acids should predominate in all dry processes, and, on this account, the sensitiveness is diminished. Since common water mostly has an alkaline reaction, and it is not convenient to use freshly distilled water for washing—by far the safest, although the most expensive, method—the water must be acidulated with acetic acid. For, however usefully alkalinity may act in the first stages of the development of dry plates, the more injuriously it acts beforehand, and especially if the plates are kept long. When common water is used for washing the plates, care must be taken to use distilled water for the first and last washings, and to add to the common water with a little acetic acid.

The length of exposure varies according to the intensity of light, as well as the nature of the development, the alkaline developer requiring the shortest exposure (20 seconds being about sufficient with a pair of landscape stereoscopic lenses and a good light); the ordinary pyrogallic acid developer requires the longest exposure. Iron development in point of sensitiveness stands next to the alkaline developer, then the above-mentioned developer with formic and pyrogallic acid.

Alkaline Development.—The negative is covered several times with ammoniacal alcohol, (*b*), which is finally poured into a clean glass containing one-fourth of the volume of alcohol of the dilute pyrogallic acid; the mixture is then shaken, and again immediately poured upon the plate. In case the exposure has been right, and the plate has been well prepared, the picture will appear uniformly in a few seconds, although feeble. All the stains, too, which may appear, become at this stage visible. With a good picture, the lights and shades are even now visible. If the picture is foggy, or has been over-exposed, the whole plate is covered with a reddish veil, in which case more citric acid is to be added to the following intensifier; if the plate has been under-exposed, nothing appears as yet. The fluid is now allowed to flow off, and the plate is *carefully washed.* A small quantity of the ordinary pyrogallic acid solution is mixed with a little citro-nitrate of silver, and then poured upon the plate. The picture now appears rapidly, and with great intensity, and has to be cautiously watched lest it become too intense. The plate is finally washed and fixed in the usual manner.

Major Russell, to whom is due the honour of the discovery of the tannin process, as well as the alkaline developer, lately complains of the sudden failure of his alkaline developer, without having discovered any satisfactory cause. Mr. Sutton gives another sort of alkaline developer, which is said never to produce either fogging or stains; and, since it may be applied to my process, I repeat it here:—

(*a*)	10 grains of bicarbonate of soda in 1 ounce of water;
(*b*)	10 grains of pyrogallic acid in 1 ounce of absolute alcohol.
(*c*)	1 ounce of water, 1 drachm of the solution (*a*).

After the plate has been moistened with water, it is coated with the solution c; this is poured, after awhile, into a vessel containing 20 drops of the pyrogallic acid solution; the mixture being well shaken, is again poured upon the plate. The remaining part of the operation is like that just given. The formic acid developer has produced for me in summer more constant results than the alkaline developer; on the contrary, during the last winter I obtained better pictures with the latter. The formic and pyrogallic acid, as far as it is possible, must be freshly prepared each time it is used.

ÆSTHETICS OF PHOTOGRAPHY.

Being Short Lessons in Photography.*—No. 34.

Blurring and Halation.

As soon as the recognition of atmospheric disturbance in photography becomes adopted, other curious photographic

* From *Humphrey's Journal.*

troubles may, we thiuk, be more rationally explained than heretofore. The *Ghost* in the photograph, according to our expressed views, is caused, *firstly*, by the peculiar constrnction of the compound lens, which produces a compound luminosity in the air by reason of the reflection of the rays of light from the posterior surfaces of the elements of the combination; this luminosity then illumines the atmosphere and vapour which are reproduced in the negative as a circle of deeper intensity, thus marring the beauty of the print. *Secondly*, even when the lens is free from such spectral reflections, the ghost will appear of the same nature as before, with the exception of shape, which is no longer distinctly circular. In this instance the sun is in front of the lens, and the atmosphere between the object to be photographed and the camera is illumined by rays at such an angle as to cause reflections to enter the lens, produciug thus an intense actinic action on the very surface of the picture itself (if we may so express ourselves), and obliterating the sharpness of definition by a ghost-like veil. When the light from the sun proceeds in a contrary direction, that is, from such a quarter as to cause all reflected rays to pass off from the lens, these very rays assist in lighting up the object, and not the atmosphere; in which case no ghost appears.

Without any desire to be dogmatic, we think we are justified in drawiug the conclusion (corroborated by many instances of experimental practice), that the best, clearest, and most artistic photographs are produced when the sun is in the hemisphere behind the operator, and the reverse when in the opposite hemisphere.

Other disturbances of almost a similar nature are—*blurring* and *halation*.

The following paragraph, from the Photographic News, defines the subject in question:—

"Most photographers are familiar with a certain kind of blurring, in which the more brilliantly illuminated portions of the picture, such as the sky, seem to trench upon or overlap the less illuminated portion in immediate contact with them. There are several forms of this encroachment of light somewhat similar in resnlt, but snfficiently distinct in character and probably different in cause. There is the well-known fringe or halo of light which is often seeu around a window with a strong light in a dark interior. There is a similar halo sometimes seen on the dark portions of drapery immediately around a large expanse of very white shirt front. There is the peculiar line of light, known generally as *halation*, often seen in portraiture between the background and some very dark portion of the figure. And there is the blurring in which sky encroaches on the darker portions of the picture, sometimes almost or entirely obliterating the finer twigs or branches of trees extended against the sky."

Various theories have been advanced in explanation of these phenomena. Amongst these will be found rapidity and energy of development, in which the deposit increases by accretion to such an extent as to obliterate all fine lines and points, and thus to encroach upon the dark boundaries of any object. A seeond theory attributes this result to reflections of light from the glass upon the collodion; a third, to the nature of the collodion and other chemical accessories.

In many instances in which we have latterly experimented, the evils here nnder consideration *were visible on the ground glass*, and are thus primarily attributable to an optical cause.

Furthermore, this blurring and halation on the ground glass were manifested iuvariably when the light proceeded from behind the objects and towards the camera. We do not maintain that this is always the case, nor that blurring and halation are always visible on the ground glass, nor that they may not be produced on the negative when invisible on the grouud glass; we state simply our experience in reference to one cause which, we are of opinion, may be accounted for.

Around the edges of objects so lighted, there is an accumulation of light *direct*, *reflected*, and *inflected*, which, acting upon the contiguous atmosphere, produces the halation, which in its turn produces the blurring or encroachment of the light parts on the dark and dense masses of foliage for instance. The same primary conditions, it is true, prevail when the sun's rays proceed from an opposite direction; but there are these differences; in the latter case, the dark colour and feebly actinic masses are well lighted by direct light; in the former they are in the shade; the consequence of this is, that the halation is quite visible by reason of the great contrast when the light proceeds towards the camera; in the opposite case it is invisible, because the reflected light from the dark-colonred, and feebly actinic surfaces is still sufficient to predominate over the halation or illuminated atmosphere.

Secondly, when the sun is behind the object, the halation is more visible, because both the direct and reflected rays from the opaque boundaries proceed *to* the camera; whereas, in the other supposition, the reflected rays pass off *in a contrary direction*. The main cause of the blurring seems to be due, however, to inflection or diffraction, which either prevails or is invisible according as the feebly actinic masses are well illnminated or in shade.

The same rule, therefore, which may be adopted for removing the ghost, is valid in preventing blurring and halation.

The rule is certainly not universal, for almost all the fine points and lines of a negative may be utterly obliterated by the intensifying or redeveloping process; and, where they are not destroyed, they are blurred. This is a very intelligible process. Originally the opaque parts of a negative are *in* or *on* the collodion film; by strengthening, as we say, they become more opaque; how? simply by the deposit or precipitation of some metallic, &c., film upon them, thus elevating those parts above the contiguous lights. The opaque parts stand out now in relief, and are no longer surfaces; any deposit upon them, consequently, will increase their size by a *lateral*, as well as outward accretion, which will blur or efface the light parts of the negative according to the extent of the intensifying. A very energetic developer or intensifier, or one continued in action for a long time, is to be avoided because of the consequent evil hence arising.

If, now, reflections from air under certain conditions are injurious to an artistic production either in portraiture or in landscape photography, it may naturally be expected that reflections from matter of more density will be more detrimental. It is incalculable how much trouble these unsuspected reflecting surfaces produce! The reputation of a gallery frequently depends upon the fortuitous absence or presence of them; and, as we said, they are unsuspected.

It is the duty, therefore, of the artist at the very outset of his career to remove all extraneous substances in the neighbourhood of his sitter, that might trifle with the physical force on which actinic action depends. Light is this physical force; it must be simplified and softened, otherwise it mars its own work. It exists, as far as photographic purposes are concerned, in two forms: direct and diffused. The former proceeds direct from the radiant, as for instance the sun, and thus illumines the object with sunshine; this is direct light. The opposite side of the object, as, for example, the back of a house, is in shade, and is much less brilliantly lighted, but is nevertheless quite visible; how is it visible? From innnmerable reflections of light from bodies behind the house; thus a cloud receives light from the sun, reflects it to another cloud, which reflects it now direct upon the back of the house or upon the earth, a sheet of water, a precipice, the sail of a ship, or even a dense layer of the atmosphere. These, in their turn, if placed in a proper position, send some of the received rays upon the walls of the house on the shady side; these rays are finally made to rebound, and on their mission arrive at the retina of the eye and produce the sensation of vision. Such light

as this is called diffused light, because it is diffused through the atmosphere, without which *all shadows would be darkness.* The back of the moon is comparatively dark, because the space between the earth and the moon is void of matter, and hence there is no diffusion.

Shades, then, are the absence of light, and these shades can be made to possess any amount of intensity from the slightest softening of sunshine to the deepest darkness, by modifying the form and position of reflecting surfaces. The eye cannot bear to look directly at the sun, because its rays are much too brilliant for the optic nerve; its shape could not be descried were it not for the intervention of the atmosphere or some other dense transparent medium.

In like manner several objects suffused with the full blaze of the sun are invisible, as, for instance, a mirror or a highly polished speculum. Thus, much light is as bad as darkness as far as the visibility of the object is concerned. Furthermore, the more brilliant the light, the deeper the shadows; these are, therefore, coexistaneously detrimental to the production of clear visibility. Besides, the greater the distinction between the lights and shades, the greater the contrast of parts; but this contrast may produce lines of demarcation which are entirely at variance with the natural divisions of the object beheld. Hence arise a natural division of objects into parts, and an artificial division. It is the artist's duty either to soften down their harshness, or to remove them almost entirely; for harshness is seldom pleasing, and is, consequently, seldom artistic.

A proper contrast of light and shade, an agreeable interspersion or distribution of both in an original composition, and the selection of the proper time and position from which a given natural landscape or portrait may be most felicitously reproduced constitute, in a great measure, the science of art. This is a subject often spoken of, but little understood. Foreign terms are in familiar use to express the desired effect. The fact that this is so indicates the infancy of knowledge, because the proper terms in the native tongue are wanting, and because foreign terms are seldom rightly appreciated. For instance, why are we obliged, or, if not obliged, why do men—the would-be artists—so often use the expression "chiaroscuro?" From pedantry or ignorance. If the fact is known, the English language is rich and comprehensive enough to express that fact.

The proper or agreeable distribution of light and shade in a reproduction or a composition will form the subject of our next lesson. For the present *au revoir!* There we have it again; pedantry to the backbone. Never mind! good bye, old fellow, for the present! Study your lessons well, and don't forget to say your prayers.

Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting was held on the evening of Wednesday, Oct. 19th. Mr. G. Dawson in the chair.

The minutes of a preceding meeting having been read, the following members were elected: Messrs. S. Thompson, Rowe, W. W. Hewitt, and Miss Lewis.

After the transaction of some matters of business,

Mr. Pouncy exhibited a number of specimens of photography in printing ink, especially illustrating his progress in short exposures. Formerly, in order to obtain a print, the prepared paper required exposing from three-quarters to an hour, and now the time was reduced to from 10 to 30 minutes. The prints he exhibited consisted purely of lithographic ink, not bitumen as some had supposed; the paper had been prepared a month, and would probably keep an unlimited time. His first difficulty was to get rid of the yellow tint in the whites which the thin paper possessed, this was now removed by the transfer process he adopted, by which the image was removed from that paper and placed upon any surface which might be selected. By using proper vitrifiable colours in the ink, the image could be transferred to china, glass, &c., and then be burnt in. The dish which he exhibited had received such treatment, the slight cracks arose from the use of an unsuitable varnish. He had sent to Paris some months ago several specimens in different colours for transferring and burning in; but he had not received any answer as to the result.

In answer to a question, Mr. Pouncy said he had asked a lithographic printer, as to the mode of preparing lithographic ink, and then made up the materials, consisting of soap, tallow, &c. &c., according to recipe, the result was a curious mass something like blubber; but still he produced clean pictures with long exposure.

After some further conversation, Mr. Pouncy stated, in reply to questions, that he had hitherto been anxious to test the keeping powers of the prepared paper before sending much out. He would be fully prepared, however, to supply it by the end of the year. Mineral naphtha might be used instead of turpentine for developing. He preferred turpentine when it had been used a few times over and over; and if naphtha were used, he liked to add at first a little oil; any kind of oil would do. The price of the prepared paper was one shilling for a sheet half the size of photographic paper.

A conversation then arose as to the liability of the pictures to injury by friction, and Mr. Simpson exhibited a specimen which he had carried in his pocket for some months, which was not, he thought, more injured than an albumenized print would have been under the same circumstances.

In answer to a question as to exposure, Mr. Pouncy said there was no visible image; experience must be the guide for exposure, and an over-exposed print made a very good transparency. The prints had not been tried for colouring, but he thought that oil colours might be easily applied, or water colours by preparing the surface with gelatine or oxgall. The question of varnishing the picture was a matter of taste.

The Chairman said he had much pleasure in confirming Mr. Pouncy's account of the increase in sensitiveness he had obtained.

Mr. Sutton, of Jersey, made a similar remark, and said some paper he had seen exposed at King's College a day or two previously was as sensitive as ordinary silvered paper. The chief objection, in his eyes was the use of turpentine, which was very disagreeable; benzole would possibly be less so. The liability to scratch also seemed an objection.

In a further conversation on this subject a general impression, existed that this was not necessarily the case. It was further explained, in reference to the transfer varnish, that the solvent ought to be a spirit, as a turpentine varnish might possibly partially dissolve the image or smear it, and anything soluble in water was unsuitable, because the tracing paper had subsequently to be damped in order to remove it and leave the image.

After some further conversation the subject dropped, and a vote of thanks to Mr. Pouncy was passed.

Mr. W. W. King then took the chair, which Mr. Dawson vacated.

Mr. Dawson then read some remarks, especially recommending photographers to bring their failures, with careful descriptions, for discussion at the Society's meetings.

After some conversation, this subject dropped.

Mr. Dawson exhibited some specimens by Mr. Collier, of Peterhead, and some by Mr. Mudd; and Mr. Cooper exhibited some clever double-printed subject pictures, illustrating laughing, sneezing, &c.

Messrs. Ottewill and Collis exhibited some dark slides, with various ingenious arrangements for obtaining the four images required in the Diamond Cameo Portraits.

Several examples of silver ebonite vessels were exhibited, and Mr. Simpson said he had kept a silver solution in an ebonite bath for months without deterioration.

Mr. Squire exhibited some specimens of enamelled photographs by the patent process of Mr. Rollason.

After some further conversation, and votes of thanks, the proceedings terminated.

Correspondence.

THE WOTHLYTYPE PATENT, AND AMATEUR PHOTOGRAPHERS.

Sir,—In the Photographic News, October 21st, you state that the Wothlytype, "is at least as beautiful" as a

silver print. In another No., you state that it is equal to Swan's Carbon, and in a previous number you say that the Carbon print has more beauty and delicacy than any silver print. Now photographers, if they can help it, will not be satisfied with any new process that does not give the detail and delicacy of the collodion positive, or the old but beautiful daguerreotype, and as we, (at a distance from London) all look up to your opinion, and are guided by it, it would be very satisfactory if we had your decided opinion on this point, which can only be determined by seeing prints by both processes from the *same* negative; doubtless you have had an opportunity of seeing, and comparing them.

There is a wide spreading desire amongst good photographers, both amateurs and professionals, I believe, to obtain a better process, in beauty first, and then in permanancy, than the silver, and it becomes absolutely necessary before making an important movement to be certain that it is in the right direction.

In their advertisement the "United Association of Photography" announce that amateurs will be required to pay a fee of £5. Now, sir, I ask you, is that wise? It will keep back a large number of amateurs who, like myself, engaged in professional pursuits, have little or no time to print from their own negatives; notwithstanding, if we wanted but one or two copies from each negative we would like to have the best; and as the company will have the sale of all the chemicals, paper, &c., connected with the process, do you not think that it would rather increase their business than otherwise, if they would sell, even in small quantities, their chemicals or prepared paper, at any advanced price they may think proper, to those amateurs who perhaps would not want more than a quire or two in the year?

Pray excuse this trouble from

A Photographic Amateur since 1844.

[In collecting and putting into juxtaposition the various remarks on the respective beauties of silver, carbon, and uranium prints, our correspondent shows us that "we must speak by the card, or equivocation will undo us." We will endeavour, however, to put the matter clearly, so that he may see there is no inconsisteney in our statements. In order to form an accurate estimate of the comparative results of the three processes, it would be necessary to examine the best prints which could be produced by each process from the same negative, or, rather, from a few negatives of different qualities. This we have had no opportunity of doing in any instance. The best carbon prints we have seen are superior to the best silver prints we have seen; but we have seen carbon prints inferior to good silver prints. The only instance in which we have seen a Wothlytype print and a silver print, from the same negative, did not permit a fair comparison, as we had one before us, and the other only in our memory; but so far as we could thus judge they appeared about equal in excellence. The carbon print will always, we think, possess some advantage on the score of delicacy and resemblance to the daguerreotype, on account of the absence of texture in the material. The Wothlytype and the silver print are both on paper, and both, we believe, capable of producing prints of equal beauty when well managed, the advantage being in favour of the former, in just such degree as collodion is superior to albumen. In this respect, and also in simple preparation of the paper, it is probable, if the suggestion in our first article be found to work well, silver printiug may be made to combine the same advantages.

In regard to this patent and its use by amateurs, it is very difficult to speak dispassionately. It would undoubtedly have been more liberal to have permitted amateurs the free use of the process. But it has been bought and paid for by a commercial company for the express purpose, not of being liberal, but of making money, and so paying a dividend to shareholders. The directors may very probably answer to objectors: "If you think we are about to make exhorbitant profit, you are quite at liberty to share with us; we are now issuing new shares and you are welcome to take part in the matter." Again, if the Association had the power of keeping the manufacture and sale of the preparations in their own hands they might possibly secure their profit in that way; but we imagine that some difficulty will exist in doing this. Their patent will probably be for a *process* and not for the manufacture of any article; and persons securing a license to use that process may obtain the materials how and where they please.

The great consolation of amateurs in a case of this kind, lies in the fact that they need not pay the money or use the process without they like. All existing uranium processes and a very good silver process remain quite at their disposal. The publication of the details of the Wothlytype process in the specification of the patent will also stimulate invention and modification in that direction, so that amateurs will be so far benefited. It is quite possible, moreover, that professional printers will obtain licenses and print for amateurs. Finally, if amateurs generally conclude that the Association are too exorbitant in their demands, they can, without the fear of losing customers or professional cash decline to make such a payment, and they are then just in the same position as if neither the discovery, nor the patent were in existence. —Ed.]

Sir,—Every man has a right "to do what he likes with his own," and "the prudent exercise of that right is, of course, another thing," are maxims which I find in last week's News, and in which I entirely concur.

But I would ask whether the prospectus put forward by the promoters of the Wothly process of printing, is a "prudent exercise" of that right which they have in it, and whether, considering that the basis of the process is collodion, which was *freely* given to all the world, and that most probably the whole of the parties most interested in it, have all largely benefited from the discoveries of such men as Archer, Talbot, Russell, and hosts of others, I say I would ask whether a charge of £5 or £6 to *amateurs* for using the process is not most illiberal, and whether the profits arising from the sale of the patented materials would not *amply* compensate them, supposing the process to be of such value as to ensure its general adoption. One cannot but compare the liberality of some to the illiberality of others, and Mr. Squire's proceedings with the "Rollason" patent, and Mr. Swan's with his carbon process, stand out in bold relief against the proceedings of this Wothlytype Association.

Fancy, sir, a man wishing to avail himself of the use of some patent medicine, and being told that he must first of all pay £5 for the privilege of swallowing it.

Amateurs, as a body, take but few negatives, and they will doubtless consider how many prints they can produce by the old system of silver printing before they consent to part with £5 5s. for a process which is only a "few months old," which is only "equal" to silver prints, the cost of which will only "probably" be less, and the greater permanency of which is only "promised." Fortunately, silver printing is in a most satisfactory state, and combined with the various enamelling processes, leaves but little to desire. The only real advantage (?) gained by this new process, seems to be that less washing is required, but £5 is a high price to pay for saving a little time, and for what can now be done by a washing machine, which requires but little or no attention. There is plenty of talent in the country, and depend upon it that if uranium printing be a desideratum (yet to be proved), processes will "crop up" which may be equal to the present one, and perhaps better.

One cannot but be surprised that some of the directors, themselves amateurs, who have benefited by the discoveries of others, should become accessory to fettering the practice of this process, by requiring so exorbitant a sum for the use of it.

I, for one, shall rest content with the present printing processes.—I remain, sir, your obliged servant,

Subscriber from No. 1.

[See note above to a letter on this subject.]

THE WOTHLYTYPE PATENT AND PORTRAITISTS.

Dear Sir,—I have just received a circular from the Association of Photography in reply to my inquiry as to their charge for the use of the Wothlytype.

By this document I perceive that they have made one of the most unjust and unfair arrangements that can possibly be imagined; they propose to charge a rate of so much per card, or other picture, *irrespective of the price* of said picture. An example will at once show the utter unfairness and absurdity of their proposition. Let us suppose that I take card pictures at the usual price of 10 for 10s., add that A. B. does a first-class Regent Street business, and 6 copies £1; the case will then stand thus:—

I pay	£10 8s. 4d.	tax on	£420 0s. 0d.
A. B. pays	£10 8s. 4d.	,,	£1,665 0s. 0d.

Could anything be more palpably absurd. Why, sir, any actuary, or even clerk in an insurance office, indeed, any one with the slightest power to calculate chances or probabilities, or in the habit of assessing values, would at once tell them that the tax must be on the *value*, not the number of the pictures. Of course, we see their difficulty at once; people are quite reluctant enough to make an *exposè* of their affairs once a year to the collector of income tax without repeating it. But, sir, to come to the point at once; why don't they say all who like to pay us £2 2s. a year shall practise *ad libitum?* I feel convinced 5,000 names would be on their books in a fortnight, and as they are understood to have given £1,000 for the process, a very comfortable dividend would be paid the *first year;* of course, I need not refer to the unquestionable fact, that before many weeks have passed over us, all who care to know anything about the process can easily do so, and not the remotest probability exists as to any one paying a second license fee.

Then, sir, look at the saving of trouble to themselves in thus consolidating the charge; and, again, suppose persons work this process, or a close imitation of it, without taking a licence, who is to stop it? Will not the Company be involved in endless litigation? and, once more, sir, suppose another Laroche come forward and combat the Wothlytypists, and defeat them, will they refund the fees they have received?

Putting all these things together, and considering that silver printing has reached a very high standard, and that the Wothlytype prints I saw at the Society's room could be matched any day by our present method of printing, I shall certainly not be too eager to rush into the new process, and will certainly not assist to support the closest monopoly photographers have yet seen, unless several of the above matters are cleared up.—I am, sir, Arg. Nit.

[The question involves several difficulties every way, which possibly may only be solved by freely investigating the subject. Our correspondent merely echoes the views of several others, for which we have not space. But although his arguments are natural enough, viewing the subject in one aspect, they do not quite meet the case. For instance, "Arg. Nit." pays just the same price for his collodion, silver, paper, &c., whether he sell a dozen pictures for ten shillings, or for two guineas, and the Association may naturally enough argue that he should therefore pay at the same rate for his royalty or licence. In making his charge for Wothlytype pictures, he has the power to re-arrange his prices; and if he pay a royalty, he can get that out of the public. The difficulty of the case is here: if the Association charge one uniform sum for licence, the portraitist with a small business is unjustly treated, whilst the large trader gains at his expense. If they charge the licence according to the past returns of each business, they become inquisitorial. But if they adopt the plan proposed by Mr. Swan, of issuing stamps at, say a farthing each, and render it imperative that no Wothlytype picture be sent out unstamped, they do not become inquisitorial, inasmuch as they cannot estimate a man's business, because he may send out thousands of silver prints besides Wothlytypes; but they will be paid in the exact ratio in which the process is practised. Possibly a licence at a uniform moderate rate, and then a charge on each Wothlytype sent out, to be obtained by issuing stamps, would be the most satisfactory to photographers, and bring the Association the largest income with the least trouble, thus meeting the claims of photographers and shareholders at once.—Ed.]

PHOTOGRAPHIC ART-UNION.

Sir,—Although in several, I may say in most, of the Art-Unions now existing, photography ranks as one of the works of art distributed in prizes; yet I cannot but think that an art-union *solely* for photography and its branches, would have a very beneficial result. 1st, on the artists themselves whose pictures from the several exhibitions would be chosen: thereby not only increasing the standard of their works, but also enhancing their value. 2nd, on those whose occupation it is to colour (in all its varieties) photographs, they would thereby become more universally known, and this branch of the art to a greater extent encouraged. Lastly, on instrument makers, inasmuch as cameras, lenses, &c., might be distributed for prizes.

I should be glad to hear through the medium of your valuable paper, your own ideas as well as those of others more proficient in the matter than myself.—I enclose my card, and remain sir, obediently yours, J. H. C.

October 24th, 1864.

[The chief difficulty in the way is a legal one. Art Unions are regarded as lotteries, and are illegal, unless some express permission is obtained from the constituted authorities. What are the proper steps to take we cannot certainly state, as we have not had occasion to enquire. We will endeavour to learn something on the subject.—Ed.]

THE DUBLIN INTERNATIONAL EXHIBITION OF ARTS AND MANUFACTURES FOR 1865.

Sir,—Having been requested by the executive committee of the Dublin International Exhibition to place myself in communication with the principal journals, societies, and leading artists connected with photography, with a view to secure as full and as representative a collection of its results as possible, I have to solicit your valuable co-operation, and to hope that you will in your pages place before your readers the arrangements made for exhibitors and point out to photographers generally the desirability of contributing to the above national undertaking.

In bringing this matter before you I would call your attention especially to the following general arrangements as a guarantee to photographers that no effort shall be wanting on the part of the committee to render the photographic department as attractive a feature of this exhibition as possible,

1st. In the Exhibition of 1865 the status of photography as a "Fine Art," is fully and freely admitted.

2nd. The space allotted to the photographic department will be ample and well adapted to its needs.

3rd. Photographs of all countries will be exhibited together, but every care will be taken to group the various nationalities in as well defined sub-sections as possible.

4th. No apparatus will be admitted into the photographic gallery except for the express purpose of exhibiting photographs, and then only by special permission of the committee.

I enclose a prospectus and hoping that we may rely on you for assistance in making the photographic department worthy of the advanced state of the art, I remain, sir, yours faithfully,

Glen Banahane, Castle Townsend, Cork. J. J. Cogill

October, 21st, 1864.

Miscellaneous.

Cold Soldering.—A correspondent sends us the following method of cold soldering. The usual method will, however, be generally found most useful:—To solder any metal without fire take one ounce of sal-ammoniac and one of common salt, an equal quantity of calcined tartar, and as much of bell metal, with three ounces of antimony. Pound well all together, and sift it. Put this into a piece of linen, and enclose it well all round with fuller's earth about an inch thick. Let it dry: then put it

between two crucibles over a slow fire, to get heat by degrees. Push on the fire till the lump becomes red hot, and melted altogether; let the whole cool gradually, and pound it into powder. When you want to solder anything, put the two pieces you want to join on a table, approaching their extremities, as near as you can to one another. Making a crust of fuller's earth, so that holding to each piece and passing under the joint, it should open over it on the top; then throw some of your powder between and over the joint. Have some borax, which put into hot spirit of wine till it is consumed, and with a feather rub your powder at the joint; you will see it immediately boil. As soon as the boiling stops, the consolidation is made; if there be any roughness, grind it off on a stone.

Talk in the Studio.

Removing Stains from the Fingers, &c.—A Cheltenham photographer, suggests, that we should remind photographers that cyanide is not necessary to remove silver stains from the finger, friction answering better. He says: "The best way to get stains off the hands, without the use of cyanide of potassium, is, first, to dip the hands in water, and then rub the fingers on a smooth stone, (the top of a stone sink will do well) between the fingers and other parts, where you can't conveniently rub on the stone, rub with a little pumice stone, this does not hurt the skin, and you can always have clean hands."

A Miner's Difficulty.—A correspondent says that a Cornish miner applied to him the other day to help him out of a difficulty. He said that he had "jnst set up a taken of potegraphs, and I dun know how it is my picters dun look right at all, for when the *devil-hopper* runt over the plate, he comes up all sort of colours, red, white, and green. Now can you tell me what I am to due to stop ut." The only advice we can give him is to persevere until he understands the results of each operation. We see no reason why the Cornish miner should not by a little perseverance, learn photography.

To Correspondents.

J. S. W., A Beginner.—A lens of such focus as will require only 12 feet between it and the model will not take a standing figure of a tall man perfectly without very considerable stopping down, and then, of course, the exposure will be long. 2. To blacken the inside of your camera, use lamp-black and size. 3. Bottles containing silver, hypo, and other solutions will get dirty in time by the partial decomposition and precipitation of their contents. As a rule, clean water and a bottle brush will clean them; sometimes other detergents must be used, cyanide for some, strong acids, such as sulphuric, for others, strong alkalies for others, and spirit, &c., for others. The cleansing agent must vary as the nature of the material to be removed does. For most cleaning purposes, a strong solution of soda used hot will answer, using the bottle brush, and rinsing well with clean water. 4. It is possible to take portraits at night, in such a room as you describe, with the magnesium light It is best to have two pieces lighted at the same time, one giving a stronger light than the other, as the principal light, and the smaller light to give detail in the shadowed side. From twelve to twenty grains are required for one portrait.

A Cheltenham Photogaaphea.—The general disposition of your light is right, but the top light is a little too direct. 2. Dissolve in 4 ounces of alcohol 8 grains of iodide of ammonium, 8 grains of iodide of cadmium, and 4 grains of bromide of cadmium. Add 1 ounce of this to 3 ounces of plain collodion.

Muff No. 1.—The difficulty of paper supplied not being uniformly equal to sample is one which we are unfortunately unable to suggest a remedy for. We try a great many samples of paper, and find the greater number pretty good; but we can suggest no method of obtaining certainty as to the quality of every sheet in a quantity supplied. Possibly the manufacturer of albumenized paper could scarcely do that. The best mode of obtaining a probability of uniform excellence will consist in giving a good price. In the wholesale paper trade, a custom exists of sending out two or three qualities of the same make of paper; the first quality is picked, and free from defects; the second and third contain the sheets rejected from the first. Now samples of this paper, from even the third quality, may be good, but the quality will be variable, many imperfect portions being included. It is only by dealing with highminded men, who albumenize nothing but the first qualities, that you can be certain of immunity from the irregularities of which you complain. The fuming process is found by many to be a great aid in securing rich black tones and freedom from mealiness. You may get black tones by almost any toning process, but the lime bath is most conducive to that tone.

Rapue.—We have stated scores or hundreds of times, in these columns, that toning baths made with carbonate of soda and gold will not keep. If you add ten grains of carbonate of soda to one grain of chloride of gold, you must use the solution just in the nick of time, or it will be quite useless. Make the bath with the gold and acetate of soda, omitting the carbonate, and use it after it has been mixed 24 hours.

Subscriber, Suffolk.—A bath may sometimes be used at once after treating with carbonate of soda or cyanide of potassium, and filtration, without sunning; but the only way to be certain is to try it. When you have time it is as well to try sunning.

Amateua.—In all cases where diffused light can enter a lens, whether in taking portraits or landscapes, it is better to use a hood, or some contrivance for the purpose of shielding the lens from such light.

E. R. W. B.—You may use the bromide of cadmium, or of ammonium with advantage. 2. The method of producing the high gloss of which you speak, has been described in our pages two or three times within the last few weeks.

Acetate of Soda Bath.—Your toning bath is twice as strong in gold to begin with as it need be; but you have introduced some decomposing element, as the yellow or brown discolouration shows. Possibly you have touched it with fingers which have touched hypo. The pink and purple discolouration of the backs of the prints is caused by gold, either the prints contained a good deal of free nitrate when placed in the bath, or you have exposed the solution to white light whilst the prints were immersed, or the gold was from some other cause in a state of nascent reduction whilst they were in the solution. In such a case you had better precipitate the gold with sulphate of iron, and reconvert it into chloride of gold with aqua regia.

A Subscaiber.—On the whole we think the calotype process the best and most simple paper process. You will find it fully described in our first volume.

G, F. S.—We do not know of second-hand lenses such as you mention for sale, but it is very possible that either Mr. Morley, or Mr. Lawley, may have them. We do not know of any landscape negatives for sale. We have handed your letter to our publisher, who will send you the numbers required.

J. Harding.—We do not know of any establishment in which the magnesium light is used for portraiture. 2. We presume that the colour is applied to the photographs in the usual way before the enamel surface is applied. 3. Corrugated iron is very suitable for forming part of a glass-house. The form must depend on position and other circumstances. You will find our general views on the subject in the chapter of the Year-Book to which you refer.

G. B. S.—We cannot inform you how far punching one figure on a card, so as to produce an effect of relief like that in the "Diamond Cameo Portraits," but with the disc of a different shape, will be an infringement of Messrs. Window and Bridges' copyright. That is a question for a lawyer versed in copyright and patent right. The cost of registration is about £10.

John S. Smithers.—If we can use any influence to help persons in your position we shall be glad; but we are doubtful as to the practicability of the plan you name. See note to some correspondence on the subject on another page.

Francis Bonomi.—The condenser in the solar camera is usually plano-convex, and so far as we see at present that form is best. The size of the condenser will govern the amount of light condensed; a 9-inch condenser is commonly used, but with a larger condenser the time of exposure is shortened. The conditions for using artificial light will, however, be materially different to those for sunlight, and we are scarcely prepared, without some careful thought, to prescribe the best conditions. We shall give the matter some attention, and refer to it again. We forget the number of diameters which the picture to which you refer was enlarged. The relative exposure for the magnesium light and sunlight must be ascertained by experiment. It is quite possible to produce photographs by the ordinary solar camera, quite sharp and perfect in all respects.

Young Beginner. No; we think not. We prefer that of the latter gentleman. 2. A good card lens is suitable for groups. 3. We cannot recommend especial makers or dealers here; you must see that the task would be a most invidious one.

Auaora.—In your position we think that turning your side light to the north will doubtless be an advantage; in fact, it appears the only mode of getting plenty of light of good quality. 2. We have never used dextrino for mounting, and do not like it. We prefer starch or glue, but you may make it with hot water, and use it cold.

M. E. H.—The address of the Association has appeared repeatedly in our advertising columns. It is 213, Regent Street.

An Amateur Chemist.—See a note to our first article in this number. 2. It is very probable that the defect of which you speak in your lens is rather in the cementing of the combination than in the polish. Lenses can be re-polished; but there is always some danger of injuring the figure in the operation. You had better get an optician to look to the matter.

W. R. Dabbs.—The letter to which you refer cannot have reached our hands, or it would have been answered. In answering questions and assisting our readers we never enquire or concern ourselves to know whether they are subscribers or not. We give to every query which reaches us, from whomsoever it may come, our best attention, and solve every difficulty as far as we can. To your first query, how to obtain the silver and gold from waste prints and solutions, we have not space to give a full answer here. You will find several articles on this subject in our last volume, and a condensation of the information they contain in our last Year-Book or Almanac. 2 In asking for a "good grey fleshing tone" are you referring to a toning bath or to colouring pictures? If the former, try 1 grain chloride of gold, from 1 to 1½ grains of chloride of lime, and 7 ounces of water; use two or three days after it is mixed. 3. For a hypo bath, dissolve ¼ pound of hypo in a pint of water.

G. B., L. M. T., Spero, Photest, and Tyro.—See letters and notes on the subject in another column.

E. Sawyer & Co.—Received, and shall have attention.

Several correspondents in our next.

Photographs Registered during the Past Week.

Mr. A. S. Watson, 2, Regent Road, Great Yarmouth.
Photograph of the Rev. Tritton.
Photograph of the Rev. J. W. Dolignow.
Photograph of Rev. E. C. Alston.
Photograph of Mr. Stonix.
Photograph of United States Senate, 1850, from an engraving.

Mr. Robert Easton, 3, Abbotsford Place, Glasgow.
Three photographs of Mr. Sothern.

Mr. Lachlan McLachlan, 9, Cross Street, Manchester.
Three photographs of Hon. W. E. Gladstone.

Mr. Charles J. F. Deana, Hammond Place, Chatham.
Five photographs of Miss Susan Galtonas, "The Daughter of the Regiment."

Mr. Henry Wm. Taunt, 26, High Street, Oxford.
Two photographic views of Burford Church, Oxon.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 322.—*November* 4, 1864.

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THE WOTHLYTYPE PATENT.

We have received a large number of letters from photographers of all classes, stating in various terms, from mild protest, to fierce indignation, the distaste of photographers to the arrangements, so far as they had been indicated, in regard to the use of the Wothlytype patent. We are requested by some to use our influence to induce the Association to reconsider these arrangements; by others, to advise them as to the wisdom of acceding to the terms demanded; and by all to permit free discussion on the subject in our pages. Since the receipt of these letters, we have had a long conference with some of the directors, and we are glad to state that the modified terms which they are now prepared to offer to photographers materially alter the case, and will, it is probable, give general satisfaction. The full discussion demanded, and the insertion of the letters forwarded, is now, therefore, unnecessary; nevertheless, a brief examination of the matter may still be useful, and will do the fullest justice to all concerned. Whatever course be right, it cannot be injured by being fully examined; it must be better for being fully understood.

Before proceeding, we have one or two words to say on the general feeling of photographers on the subject of patents. Perhaps there is no discovery which has involved so much that is new and useful, and which has been so lucrative to individuals who have contributed in no degree to the discovery, which has been at the same time so free from the trammels of patent right, as photography. This freedom has contributed at once to the advancement of the art, and to the advantage of photographers, and has been fortunate for both. But this freedom from restriction in the great processes has induced a feeling of impatience of any fiscal restraint or charge upon any process. The circumstances connected with the origin of the collodion process, would have rendered it difficult, if not impossible, to patent it. Since then, modifications and improvements of all kinds have been freely and liberally contributed by numbers of persons; and many photographers have almost acquired the notion that having obtained so much fortuitously or liberally, they have a perfect right to all which may be discovered on equally easy and liberal terms, and they feel injured at the slightest restriction. It has unfortunately happened that this feeling has been confirmed by the fact that many of the photographic patents which have been obtained, have been for inventions of the pettiest character, or for things which already belonged to the public. Thus a patentee, however legitimate his claim, or however beautiful his process, has not only to combat vested interests, and overcome the *vis inertiæ* of habit, but to remove the strongly rooted prejudice which is ready to denounce any monopoly or patent charge as illiberal and oppressive.

At the outset let us understand the position of the respective parties concerned in the Wothlytype patent charges. The United Association of Photography in their corporate capacity exist solely for commercial purposes. They are not the discoverers of the new printing process, and therefore any question of liberality or illiberality in giving or withholding from photographers, does not concern them, but the inventor. They have purchased the patent right for this country solely as a commercial speculation, and one of their premary considerations must be to secure to the shareholders a fair dividend upon the amount invested. We do not mean here to intimate that gentlemen who have been so many years honourably connected with amateur photography are not anxious to promote the interests of the art in conducting their business operations; they doubtless believe that in investing their capital in a permanent printing process they are very materially advancing photography; but still their primary consideration in this business must be a commercial one. It is clear, therefore, that they must in some manner make a profit out of the general use of the process they have purchased. This is the position of the Association.

That of photographers is a very simple one. A new process giving beautiful results by simple and economical means, and with a promise of great permanency, is offered to them. If the advantages held out can be obtained at a moderate cost, they will probably be thought by many well worthy of acceptance at once, as enabling them to be early in the field with an important improvement, and thus giving a new impetus to business. Should the charges be high or oppressive, still more will naturally wait for the verification of the claims made, and to ascertain if on re-examination of existing uranium processes in the light of further experience they will yield similar results. One of our correspondents puts this part of the case clearly and we will give an extract from his letter. After some preliminary observations he says:—"I think from the tenor of some of the letters in your last that photographers are exciting themselves unnecessarily. The game is really in their own hands. The Association may make their demands or licence fees as heavy as they please: it matters not; photographers need not pay them. The sole danger to photographers, especially to professional photographers, lies in any exhibition of indiscreet eagerness. My advice to photographers is, "wait:" at present we know but little of the pictures; we hear that they are beautiful, but they appear to be very jealously guarded, very few people have seen them at all, and no one that I have heard of has had an opportunity of comparing them with silver prints from the same negative. You have tested them, Mr. Editor, and have reported favourably; but your tests appear to have been limited in number, and will require to be more extensive and general to be conclusive. The secret as to the materials used appears to be guarded with still greater jealousy than the pictures. As the specification of the patent has been filed some time, secrecy is unnecessary to make the patent safe, and it has been customary in case of

many photographic patents to make the matter public as soon as the necessary steps for protection have been taken. The details must be published in a few months; why not at once, so as to enable photographers to know what they are purchasing? Unnecessary secrecy always looks suspicious. Who knows but that in some of Mr. Burnett's voluminous papers, which I am afraid were never as much studied as they might have been with advantage, the Wothlytype process or something as good lies now perdu and only requires exhuming? I repeat that I think photographers can better afford to wait than to 'buy a pig in a poke' at a heavy price."

These, then, being the positions of the parties concerned, the question is how the Association can best secure their own end, and meet the wishes of photographers at the same time. A price must be paid. The Association have paid money for the process, and will of course require money for its use, and professional photographers who hope to make money by it, will not of course object to pay reasonably for the opportunity of doing so. There are three modes in which a revenue can be derived by the Association. First: by reserving the manufacture of the preparations in their own hands, and deriving a profit from the sale. Second: by granting licences at a fixed price. Third: by granting licences at a rateable price, exacting a royalty.

The first plan involves difficulties, as it compels the Association to become manufacturers on a large sale, and compels them to add to the price of the material the value involved in the right to use it. Much could be said in favour of the method notwithstanding; but the Association objects to all which it involves.

The second plan may be said to involve an injustice, as it makes the charge as heavy for an obscure village portraitist, as for the most extensive West-end establishment issuing many thousand of prints weekly.

The third plan, in which the payment depends upon the work done and the profit gained, is manifestly most equitable in principle; but objections are alleged against it on the score of its inquisitorial character, and of the difficulty of keeping accounts and collecting the cash.

It must be confessed that from the statements made in some of the communications we received, it appeared that the Association had combined the evils and objections of two of the methods. They contemplated it was alleged, making an inquisitorial demand as to the amount of a man's income, and then fixing the licence at an arbitrary price to be decided by themselves after learning his income. Such a system was clearly out of the question, not merely because no man will tolerate such enquiries generally, but because he most specially objects to an enquiry from the principals of a rival establishment.

We may state at once, however, that after a full consideration of the objections to the method before contemplated, the Association have abandoned such a course. They have now determined, that notwithstanding the unequal pressure of a uniform charge for licence, such a plan presents the fewest difficulties or objections. The charge to professional photographers for a licence for the whole period of the patent, is fixed at £10 10s. This is not an exorbitant sum; and although it may press more heavily on the humble portraitist than on the owner of a large establisment, there are not many we apprehend to whom such a sum will be a very serious matter. We are the more inclined to this opinion when we remember that many provincial photographers have recently given precisely the same sum for a sham licence to practise a process which was published and abandoned years ago.

Our own opinion was, we must add, however, in favour of a rateable system, and we believe that it might be worked without much trouble, annoyance, or risk to any one. The system we recommended was the stamp system. Stamps at a very small price might have been issued by the Association, for affixing to every picture sold by the photographer. Any print issued without such a stamp to be regarded as an infringement of the patent. The amount of income received by the Association would be in the exact proportion in which their process was used. The amount paid by each individual photographer would represent the exact degree in which he had profited by the patent. No injustice could in such case be done to either party. By proper contrivance, the system might have been divested of anything offensive in any respect. It is unnecessary here, however, to dwell upon the subject, since another course, free from much objection, has been decided upon.

To those of our correspondents who have asked us to advise them as to the wisdom of taking licences, we must simply say, that we publish all the information we can obtain on the subject; but must decline the responsibility of advice. We admire the results of the process—so far as we have seen them. We admire the simplicity of the manipulations—so far as we have seen them. The cost of prints will be less than that of silver prints—so far as we can judge. The stability appears to be greater than that of silver prints—so far as we have tested. And, so far as we know at present, the patent is valid; but that will be better known when the details are published. With this information before them, photographers can judge for themselves. But we should recommend every photographer to see a specimen for himself before deciding, and we recommend those who can, to test for themselves the probable permanency of the results. As to whether it will be wise to expend money upon a licence, until the details are made public, must depend upon circumstances in each case. It may be useful to some to derive the prestige of the first use of the process; others can wait. Possibly, the details will be published shortly; but before many months the specification will be accessible, and the whole details will then be made public.

In regard to amateurs, our own conviction is opposed to any licence charge in their case. We conceive the Association will do wisely to seek for the remuneration, in such cases, from the profit of material. At the moment we write, the question is undecided as to whether the process will be placed at the service of amateurs, on the condition that they avoid piracy, as to the manufacture of the patented preparation, or whether to charge a small licence fee, something like a guinea, and permit them to make their own preparations, if they are so inclined.

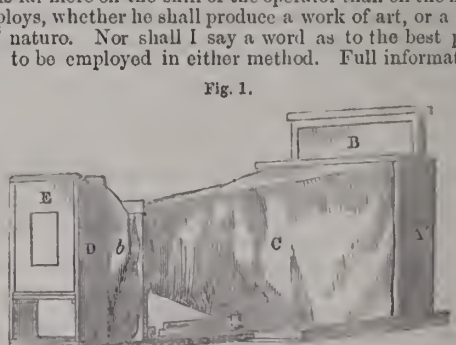
Since the above was in type, we have received an intimation that amateurs will be permitted to practise the process without any licence whatever.

A CAMERA FOR PRODUCING ENLARGED NEGATIVES.

BY J. BURGESS.

IT is not my intention to say anything about the respective merits of the different methods of enlarging. The solar camera, I believe, is best for some purposes, and the plan of obtaining an enlarged negative has its advantages also in other cases. It depends far more on the skill of the operator than on the method he employs, whether he shall produce a work of art, or a caricature of nature. Nor shall I say a word as to the best process or lens to be employed in either method. Full information of

Fig. 1.

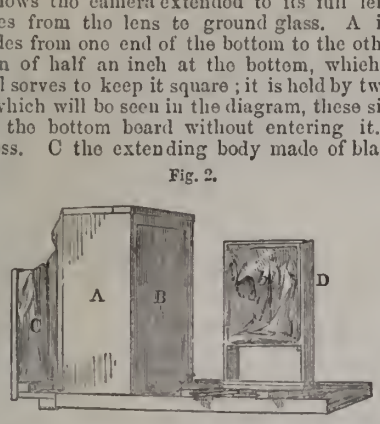


that kind has already appeared in the pages of the PHOTOGRAPHIC NEWS. My object is simply to describe a camera I had

constructed, a few months ago, for the purpose of enlarging, and which I find very efficient. It is made of deal, black cloth, and strong elastic, cost about £3, and is so simple that any carpenter can construct one from the accompanying diagrams.

Fig 1 shows the camera extended to its full length, being sixty inches from the lens to ground glass. A is 24 inches square, slides from one end of the bottom to the other, and has a projection of half an inch at the bottom, which slides in a groove, and serves to keep it square; it is held by two screws at the back, which will be seen in the diagram, these simply screw down into the bottom board without entering it. B is the ground glass. C the extending body made of black doeskin

Fig. 2.



and is supported by strips of strong elastic, running from each corner. It will be observed that the bottom of the camera consists of two pieces, one sliding into the centre of the other; a screw at *a* prevents the elastic from shutting up the camera, and keeps all tightly fixed. D is the box for the transparent positive. It is screwed on to two pieces of wood having grooves to fit the smaller part of the bottom of the camera. The grooves may be seen in fig 2. E is the slide carrying the transparent positive; *b* is a hood for the lens, if this is made of black lining (black cotton twill) it will not require any supports. The letters in each figure refer to the same parts.

[A proof from an enlarged negative produced in the camera with which Mr. Burgess has favoured us, is one of the most perfect enlargements and charming pictures we have had the pleasure of seeing produced by photography.—ED.]

CONCERNING THE USE OF ALBUMENIZED PAPER.

BY FERD. BEYRICH.

THERE is no preparation made for photography that causes so many complaints as albumenized paper. But no material is prepared faultless with greater difficulties than this paper, because both materials of which it is made, rough paper and albumen, are seldom to be got in an equal state. The manufacturer of the first operates with organic matters, rags, starch, resinous soap, &c., which are never the same in their qualities; and the uncertainty will be still greater with the albumen, which differs already, even in the fresh state, according to the season and many other circumstances, and after short keeping will undergo changes having the most important influences, because of its extraordinary instability and liability to fermentation; even all circumstances being the most favourable, it may happen that the paper, faultless by itself, gives the most variable results.

For the following I intend to treat upon some singular appearances occurring from time to time, *e.g.*, the imperfect contact of the silver bath with the surface, as when the solution runs off as from a greasy surface, when the paper becomes blistered or lets go the albumen film, and to propose the best remedies against them.

At the end of summer and at the beginning of autumn, the first-named result often takes place; the film of albumen is not equally moistened on the silver bath, and, on removing the sheet from the bath, runs from the paper in stripes like from a greasy surface, and after drying some drops will remain, which, after exposure, form darker spots on the copy and curl the paper of it.

This defect is not founded on the chemical condition of the paper, nor of the albumen, but only on a physical quality of the latter, viz., the different state of humidity, according to the temperature and the humidity of the atmosphere.

The albumen forming a hygroscopic substance, dries up in the warm and dry air, to a horn-like matter not easily to be wetted by water; but in a wet atmosphere becomes soft and spongy. Between these states exist a great many variations; and these will affect so essentially the qualities of the albumenized paper, that in one case it proves excellent, in another really useless.

A well-working paper may deteriorate in a high degree when kept in summer-tide in the warm study or copying-room; the coat of albumen will dry up quickly, unite with the silver with difficulty and unequally, print but superficially and incompletely, and will give in the toning bath, at the places where the paper has more body, the well-known spots and stripes. The want of humidity, also, causes the bad running off of the bath. But humidity is very easily imparted to the paper *by keeping it in single sheets from twelve to twenty-four hours, in a cool and humid place*, for instance, in a cave; after that it may be silvered as usual. The photographer adopting this method will soon find out the difference in the behaviour of his paper, which will not only be free from the before-named bad qualities, but will be also a great deal more convenient for silvering and further working.

The second operation, the separating of the albumen coating, depends partly also upon a want of humidity; but may be favoured in a high degree by a hard and highly-polished rough paper.

A dry coat of albumen, when coagulated by nitrate of silver, will become a parchment-like skin; but when it had a sufficient supply of humidity, the skin is changed and will be more porous, so that all solutions will enter into it with greater ease and uniformity, and also the toning of such a paper will succeed decidedly better.

The separating of the albumen film, which takes place often when the print is washed after fixing, is caused, without any doubt, by the unequal extension of paper and albumen in the water. A hard and horn-like albumen coat expands less easily than a soft one; in consequence of which, different tensions will occur between the paper and the albumen coat, occasioning the forming of blisters between them, or a fatal separation from each other.

All these troublesome results are, therefore, easily and simply remedied by keeping the paper, as above mentioned, in a humid place before silvering. Too much humidity has done no harm till now, but a paper dried up intentionally always causes great inconveniences. — *Photographische Mittheilungen.*

Berlin, September, 1864.

PHOTOGRAPHIC TOUR IN EGYPT.

BY M. LE VICOMTE E. DE ROUGE.

(Continued from p. 390).

IN a communication sent to the *Académie des Inscriptions*, and published during my journey, I have explained the new facts which prove the establishment at Tanis of the invaders from Asia, which tradition named *Hyksos* or the Pastors. M. Mariette has also prepared a special report upon the curious questions raised by these new monuments; this skilful archæologist will retrace in a very complete manner everything that the ruins have taught us upon the relations of Egypt with its oppressors, relations which throw no less light upon the ancient condition of the Semitic races than upon that of Egypt towards the eighteenth century before our era. I limit myself, then, to mentioning here the beautiful photographs taken at Sân, by M. de Banville, and in which the mixed style of these curious monuments may be studied as well as on the spot.

The expulsion of the Pastors marks the beginning of what is called the Second Egyptian Empire: it opens with the epoch of its great conquests which established the superiority of Egypt during many centuries. We are not yet upon

the domain of an exact chronology, but the difference between the results of the several calculations is already singularly diminished: according to some this era opens with the eighteenth century, according to others, with the sixteenth century, before Christ.

The most arduous task does not here consist in searching new texts; the numerous historic pages, graven upon the monuments and already published, had need of being carefully collated on the spot, and we have given considerable time to this minute verification at Assouan, Silsilis, El Kab, Karnak, Luxor, Medinet, Abou &c. Our researches have often been repayed by happy additions or important corrections of texts become classic in history.

The difficulty of copying with exactitude certain hieroglyphic inscriptions can be understood only by those who have had the courage to pass long hours in disputing a text with surfaces half destroyed by the action of time. There, where we have profitably spent entire days, other eyes, more piercing, and working perhaps in other conditions of light, may yet come after us, and find something to repay their labour.

The monuments of the eighteenth and nineteenth dynasties have also furnished a large contingent of new texts: putting aside secondary inscriptions, which have assisted us in completing the history of this epoch. I invite attention, more particularly to the commencement of the historic poem, on the campaigns of Rhamses II (Sesostris). This fragment, so important in the twofold point of view of history and literature, was previously known by the Papyrus Sallier, of which I gave a translation several years ago; but the first pages of this manuscript were lost, and the text commenced in the middle of a sentence.

Champollion had already noticed fragments of the same poem on the external wall of the temple of Karnak: I have also recognized another example upon the first pylon of Luxor, but it was deeply buried behind the original site of our obelisk of the *Place de la Concorde*. The excavations, undertaken before our eyes, have brought to light everything that still exists upon the two walls, from the commencement of this admirable document. By completing one fragment by another preserved at Karnak and Luxor, we can affirm that the work of the Egyptian poet, who had thus been judged worthy of being inscribed upon the beautiful temples at Thebes, will be rendered almost entire.

We have also brought very interesting unpublished texts of another phase of Egyptian history, which developed itself towards the fourteenth century before our era. At this epoch, some names hitherto unknown appear among the rival peoples of Egypt; they belong in great part to the *white* race, whom the Egyptians named *Tamahou*. The one then occupied a portion of the African littoral, the others dwelt in the isles and on the coasts of the Mediterranean. Their first attack took place under the reign of Menephthah, son of Rameses II.; it presents itself with the very decided character of an invasion. Egypt had to defend her own firesides; an inscription composed of seventy-seven columns of hieroglyphics, and brought to light by our excavations, will add much to our knowledge of these people, and throw light upon the terrible war that Egypt sustained against them.

These are the same enemies, augmented however with new allies belonging to the same races, which we meet again under Rameses III., at Medinet Abou.

The ruins of this admirable edifice are not yet all excavated, and many great historical pages are still buried almost to their summits. Nevertheless, I have been able to copy or photograph long unpublished inscriptions referring to the history of this time.

It is impossible but that the study of these documents should throw an unexpected light upon the primitive populations of the Archipelago, and perhaps upon the Pelasgic races to whom the surface of the sea apparently belonged before the development of the Phœnician power.

I pass rapidly over the new facts relative to the last period of the history of the Pharaohs, notwithstanding the numerous inscriptions which relate to them, and which complete, rectify, or enlighten our historical knowledge. It is thus that the twenty-first dynasty of Manethon, which was almost unknown upon the monuments, has found its chief Smendes and several of its kings in the ruins of Tanis. It is thus that the origin and progress of the power of the Ethiopian kings, who invaded Egypt during the eighth century before Christ, have had much light thrown upon them by inscriptions discovered at Gebel Barkal; but I must hasten to conclude this enumeration.

If we now descend to the time of the Greek dominion, it is to be feared that the monuments brought to light by the excavations of the Egyptian Government are less rich in curious revelations. But we are quickly re-assured as soon as we examine the temple of Edfou, and see it come out all living and entire from the ruins which had overwhelmed it, which includes all the Ptolemaic temples, and could almost replace them of itself.

The first impression the archæologist experiences in commencing the study of these long walls all covered with pictures and finely cut inscriptions, is a feeling of weakness. He must choose and limit himself under penalty of seeing the time pass, and the task increase before him every time he gives it a more attentive examination. We have copied, copied without intermission, while the photographer multiplied his proofs wherever sufficient light illuminated the pictures and inscriptions selected. Edfou is the true repertory of Egyptian mythology.

Without doubt the Greek genius throws some light upon the details, but the basis of the antique religion has not materially altered, the most that can be attributed to the new spirit is an unlooked-for development of the myths. If the funeral hymns be excepted, religious texts of any extent are extremely rare upon the Pharaonite monuments; we have encountered developments analogous to those at Edfou only in a simple temple at Abydos, constructed by Seti I., where we collected very important hymns. Edfou remains therefore extremely precious in this respect. Compared with the representations of Philoe, which they complete, the figures and legends of this temple form an inexhaustible subject for study in the domain of Egyptian religion: we have brought an enormous series of inscriptions with us.

The sub-basements of the various parts of the temple also present us with a very attractive subject for study. Their decoration consists of veritable geographical treatises conceived in the spirit of the time, the invariable programme of which is—the sovereign offers his homage to the gods of the temple, to whom it is required to bring and present all the religious of his empire.

In the more extended lists, each province is escorted by its principal cities, the best products of which are often enounced. Other series of pictures and inscriptions enumerate the gods venerated in each locality. We have also completed the copying of these precious documents.

I have been less attracted to the later temples of the Egyptian style constructed during the time of the Romans; not that their study would fail to be profitable, but their inscriptions deter the archæologist by their confusion and the bad style of the characters, which moreover are often difficult to read, or effaced, because they were engraved in relief in blocks of sandstone.

Nevertheless, I shall mention a subterranean discovered recently in the southern division of the great temple of Denderah; the only entrance to it was concealed by a moveable stone which appeared to form a portion of the decoration of the hall.

Displaced by chance, it gave access to a series of passages and small dark rooms, where probably the trials of initiation were accomplished. It is certain that, notwithstanding the state of dependence in which the country then was, we read upon several doors of this subterranean a prohibition against their being passed by the profane; the Asiatics and the Greeks themselves are especially excluded. The representations are also analogous to those we see in other parts of the

temple. We have made ample study of them, by copying all the legends which accompany the religious pictures with which the sides are covered for the length of more than fifty mètres.

Such are the principal results of our explorations: they extend from the site of Tanis to the isle of Philoe: the excavations directed by M. Mariette have not yet passed those limits. We have also been able to convince ourselves, at a first glance, in ascending the Nile, that the three months we remained before the heats did not suffice to terminate the most essential part of our mission.

When we regained Cairo, the symptoms of fatigue commenced also to make themselves felt, and we were warned that it would be prudent to return, notwithstanding the regret we felt in having to leave aside many localities of great interest. If the climate of Egypt is excellent during the winter months, it is none the less true that too assiduous intellectual labour soon becomes very painful, and often leaves sad traces in the organization. We cannot exceed a certain amount with impunity; our first harvest was so abundant, that a long life of labour would be insufficient to exhaust it.

It is a part of my duty, before concluding this first report, to render homage to the zeal of my fellow travellers, without whose aid my mission would have been imperfectly fulfilled. They never shrank before the incessant labours that the abundance of materials imposed on us, and which often gave a very severe aspect to this beautiful journey. I owe, also, my thanks to M. Mariette, who so skilfully guided us, and frequently seconded my son in the painful task of copying long inscriptions.

M. Weschcr has already made known to Your Excellency the valuable results he has obtained; philology and history are largely benefited; I can but render my best testimony to his knowledge and zeal. The deciphering of the very numerous *graffiti*, exhumed by him from the tombs of Bab-el-Moluk, may be especially mentioned as a masterpiece of sagacity and patience. With respect to the collection of photographs executed by M. de Banville, it has already won the praises of the connoisseurs of this difficult art.

He has rendered the figures with all the delicacy of the model. The views of the monuments with their half-tones, and all the truth of perspective, and the inscriptions with a degree of sharpness, such as we have never before seen in photography brought from Egypt.

An artist satisfied with nothing short of perfection, he has always sought to attain it by adapting his processes to the variations of heat and light, and also to the nature of the object he copied.

Thus seconded upon a soil still so rich, our labours could not possibly be fruitless; we are conscious of having faithfully discharged our duty in proportion to our strength and ability in the mission confided to us, and we hope that archæology may be long enabled to derive valuable information from them.

I shall have the honour of developing to Your Excellency, in a more detailed report, the new facts which the first examination and study of our inscriptions shall successively reveal.

The first epitome of our labours will enable you to understand how many interesting questions it will be necessary to touch upon in this examination; questions arduous and insoluble hitherto, but which must now be resolutely attacked, as the immortal discovery of Champollion has placed the elements of discussion in our hands; and because they impress themselves on the historian of antiquity, as one of the first subjects offered to his meditations.

PHOTOGRAPHY IN INDIA.

I have long intended writing to you, but have put it off continually. I have jotted down many little wants of photographers in this country, and many imperfections in apparatus sent out from England.

I will begin with the cameras. All "tourist," "portable," "bellows-bodied," and "multum in parvo," cameras, are simply worthless. The damp and heat are fatal to all these "dodgy" contrivances. A good rigid camera, with folding tailboard, made of well-seasoned mahogany or walnut, and brass-bound, is the only one that will stand this climate. There is generally too much French polish about the whole thing; the inside of the slides should be blackened, as also the frames for the various sizes of glasses. The back should be made to open inside the camera, as I will explain further on. The pulling up of the slide is objectionable, it shakes the camera, always sticks in the wet weather, and is loose in the hot.

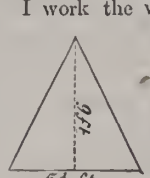
I had a Powell's stereoscopic camera sent me by an eminent firm in London, and a most beautiful piece of workmanship it was; but it was utterly useless for this country, and I returned it immediately. I offered it to a house in Calcutta, taking off 25 per cent., but I could not get rid of it at any price. I think all cameras should be supplied with a double slide for dry plates, as well as the single one.

The focussing glass should be either attached to the camera, or made moveable, so as to admit of the slide being placed in position without removing the glass from the camera. I have seen several cameras made on this principle. With regard to the glass baths; they are always made the wrong way, the opening should always be on the largest side of the glass, for in large plates there is generally a want of sensitiveness, which is attributable to the want of sensitizing solution. A bath for 10×8 plates should be at least 12×10 inside measurement, and open at the longest side. The cases of these baths should be much larger, for if you break a glass bath you can never replace it, but by buying case and all. A great number of glasses are broken coming out, and cases can be bought for a mere nothing. Each case should be made large enough for the bath to have a felt cover to it, which would render the chances of its breaking almost impossible.

A strip of pure india-rubber, a quarter of an inch thick, should be put at the bottom of the bath (loose, so that it could be taken out and cleaned), which is preferable to putting it on the dipper. The door in the wooden case is an excellent arrangement. No dish of any kind should have a lip to it; they are much easier to pour from without lips. The ebonite trays are first-rate, and should supersede glass entirely. For funnels, dishes, dippers, and the inner frames of "backs," ebonite is excellent. The printing frames procurable out here are heavy, clumsy, and expensive; in fact, everything relating to photography is 20 per cent. dearer than it ought to be. I think the makers at home send out their old stock to India, for there are hundreds of novelties advertised that never reach this country until they have become old and unsaleable in England. I will enclose a list of the prices of some few articles, and you can judge of the difficulties (pecuniary) that we have to contend with.

I will now give you my experience of about four years' photography in India, and if there should be any information in my notes I shall only be too glad to have forwarded the art in even a small degree. In the first place, heat and dust are the great enemies of photography; the next is the expense.

I work the wet process, and the tent I find most convenient is made as follows: First, cut a paper pattern, triangular in shape, the base of which is 5 feet 6 inches; from the centre of this to the apex of the triangle is 9 feet. Next procure some yellow-orange cloth (to be found in almost any bazaar in India; the best I ever bought was in Maul Mien, where it is the sacred colour worn by the priests), some black glazed calico, and some white cloth (doosooshee it is called out here). Three triangles like the pattern are cut from these cloths, laid one on the other, (the yellow being between the black and white, and the glazed side of



the black lining next the yellow), are strongly sewn together, two inches from their outer edge; this completes one side of the tent, three others are made in the same manner, and when all are ready they must be sewn together (the white cloth outside), and up the inside of the seams is sewn strong tape, 2½ inches wide; four bamboos are then inserted between the tape and the cloth; a fringe of coarse cloth (double) two feet deep, is sewn round the bottom of the tent; the lower ends of the bamboos encased in leather, with thin rope attached, completes the arrangement. The top of the four bamboos may also be covered by a leather cap. The fringe is to keep out the light; a square piece of matting on the ground makes the tent more comfortable. A door is cut in one side, and is covered by a curtain 18 inches wider each way, and of three thicknesses of cloth. A window is also cut in the black and white cloth, and an extra fold of yellow cloth sewn over that, which will be now exposed by cutting out the window. In my tent I have an extra fold of black blanket. The cost is about 20 rupees (£2). It is more roomy, cooler, and quite as portable as any tent I know (it is not half a load for a Cooly). It can be made in any part of India, and by native tailors. The interior must be fitted up according to the owner's taste. In mine the box that contains the chemicals serves as a seat; and I am going to have pockets, &c., added inside, for bottles, glasses, cloths, &c.

I forgot to say four iron or wooden pins are necessary, as when driven into the ground the ropes of the bamboos are attached to them, and they serve to keep the tent well stretched. A hurricane won't blow it over.

I have never tried a developing box, but think of getting one of Blanchard's. What do you recommend?

With regard to formulæ and manipulations, all I have learnt is from the PHOTOGRAPHIC NEWS, which I consider the best book yet published; for it contains *everything*, written in plain language, and nothing that I have tried, recommended in it, has ever failed, unless by my own fault.

I have only tried one *dry* process, and that is the resin, which is very good. I am frightened at the tannin process, by the immense number of points in which a failure is probable, and the number of cautions surrounding it. A good dry process is the thing for this country, and "resin" is the one which will be in more favour than any other. (*Vide* vol vii., PHOTOGRAPHIC NEWS, article "Wet and Dry Collodion;" also, vol. viii. page 76.)

Bromo-iodized collodion and iron developer are what I use, and in time I hope to attain perfection. The sugar and iron, as proposed in your No. 285, vol. viii., is excellent. The double salt is very good, but I think it is apt to leave a deposit on the shadows; this may be from bad management on my part.

Iron and tartaric acid make a first-rate developer, is very quick and clean, and requires no intensifying.

Iron	... 15 grains
Tartaric acid (commercial)	... 15 grains
Water	... 1 ounce.

I may mention that Dr. Hill Norris's dry plates don't keep well out here; from the few I have tried, and the remarks about them I have heard made by protographers, I find they require a very long exposure (twenty seconds in bright sunlight only gave the outline of a positive I tried to print on one of these plates), and in development become covered with air bubbles. By the aid of a soft camel-hair brush, the whole of the upper coating can be removed.

Ponting's bromo-iodized collodion is very quick, but, I think, wanting in intensity. I forgot to mention among the "enemies" a most malignant one, viz., *varnish;* the best is amber. I make it myself and never have any trouble with it. The best in the market is made by Spencer, of Glasgow. Thomas' is very good, when you can apply it; but it is difficult to use. A varnish made by J. Lyell, Allahabad, called "alcoholic varnish," to be applied cold, is no good, for it dries opaque.

The best albumenized paper I have used is Schering's. I have used it for two years, and have not had a bad sheet. I use a 70-grain solution for sensitizing.

My bath was made about two months ago, by dissolving two anna bits in nitric acid and water, and, although it has had additions of nitrate of silver since, it has always retained its clearness, it is still of a greenish-blue colour, from the copper contained in the bits (32 in number). I have tried nitrate of soda, but not long enough to speak with certainty as to its use.

I use the acetate of soda toning bath, made some time before wanted, and used over and over again. Starch is the best for mounting. I have known prints mounted with gum drop off the mounting board in the rains.

I think I must leave off for the present. I will send you some more jottings on another occasion. If you find a good deal of stale news in this, you may omit it, and make allowances for my being a resident in this benighted country.

The "back" I spoke of in the former part of my letter should have the sliding front removed, and replaced by a shutter, on the same principle as Dallmeyer's instantaneous one, only opening downwards, so that the foreground might be exposed longer than the sky, and by this means clouds would be obtainable.

A slit might be cut down each side of the camera where the dark slide goes, to admit the iron wire which is attached to the brass button on each side of the shutter; and to this iron wire should be attached an index, and to the side of camera a brass scale marked with degrees. The focussing glass should have a flap and shutter attached in the same manner; and by reading off the angle at which the sky line was shaded, the operator would be guided when the ground-glass screen was replaced by the sensitive plate. I trust you understand this; but it is difficult to express my meaning without diagrams, and I am no hand at drawing. I omitted to mention that there should be a spring by which to fasten the shutter when the exposure is completed. The spring should pass through the top of the dark slide, terminating in a button, the pressing down of which would release the shutter. This arrangement could only be applied to landscape and portrait cameras. It would not do for stereoscopic cameras. "BARTON."

Mussoorie, India.

ÆSTHETICS OF PHOTOGRAPHY.

BEING SHORT LESSONS IN PHOTOGRAPHY.*—No. 35.

THE subject of our present lesson is the proper or agreeable disposition of light. It is one of the highest importance, because on this depends mainly the success of the photograph.

What do we propose to gain or attain to by this proper or agreeable disposition of light? A reproduction of the model in *relief, distinct,* and *simulating nature in her best mood.*

The subject may be discussed under two heads: the *portrait* and the *view.*

To Light the Model for a Portrait.

In order that any object may be in relief, three essential points have to be attended to; correct focussing, the proper distribution of light, and the aid of colours. The first of these has already claimed sufficient of our attention for the present; the second is the subject under consideration.

The nearer an object is, the brighter it appears; this difference of light excites the sensation of a difference of distance, and a difference of distance produces relief.

The aim of the photographer, therefore, seems to be clearly defined in reference to the distribution of light; he has to arrange the illumination in such a manner as to be brightest on that part of the object which is nearest, and to diminish in intensity gradually towards the background.

To be brief, the task of the photographer here is to handle the light as it were with a pair of reins.

* From *Humphrey's Journal.*

Can this be done? This is the question.

Intense light cannot be so handled, or at least by no means easily: but, when softened down, when diminished as regards intensity, it can be guided and directed, diminished or increased on one place, and *vice versâ* on another; in fact, such a light is entirely within the control of the artist.

How can light be softened, and hence controlled?

In the first place, there are two sorts of light, photographically speaking; light which produces luminosity or makes objects visible, and light which produces actinic or chemical effects: the former consists of the yellow, orange, and red parts of the spectra of solar and other original radiants, whilst the latter comprehends the blue and violet parts.

The former of these are troublesome to the photographer, by being somewhat unmanageable; but they may be *removed* to a great measure, leaving their actinic light to operate.

It is the property of transparent media to transmit only light of the same colour as that which they themselves possess or reflect, and to absorb all the rest; thus yellow glass transmits yellow light, and blue glass blue light. In like manner, coloured opaque media reflect their own colours; for it is by the peculiarity of the reflecting surfaces that matter *has* colour.

Hence, a room may be suffused with any colour desired, by transmitting light through the proper medium; it may afterwards be modified by reflectors.

The Proper Colour of the Light for the Glass-Room.

The best light for photographic operations in the glass-room is a bluish coloured light. This is obtained by glazing *all* the windows or inlets of light with actinic glass, which has a violet or bluish tinge, this glass being coloured with cobalt as a part of the ingredients of its composition. An additional aid to this arrangement is to paper the walls and wood-work with blue paper. It is thus that all light bordering on the yellow side of the spectrum is excluded, and photographic light alone admitted. In such cases, where the skylight and side-lights are glazed with ordinary glass, the same end may be attained partially by either covering the glass with a coating of blue colour without gloss, or by screening the windows with blue gauze curtains. The carpets, too, may be advantageously of the same colour, or of some shade or shades bordering on blue.*

In this way the light is much less luminous, but equally actinic with the light before the absorption of the more luminous rays. It is *photographic light*, and is now manageable; this is an important victory for the artist.

How to Arrange the Photographic Light.

The glass-room is furnished generally with a skylight and a side-light. It would be more advantageous to have two side-lights opposite to each other; but this is seldom practicable, by reason of the peculiar structure of the building.

We will take the case which most frequently occurs.

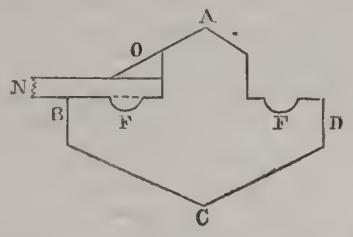
The skylight is supposed to have a northern aspect, the ridge of the roof being east and west. In this case it is advisable to construct the skylight and side-light, in continuation, forming an angle at the eaves of about 120 degrees, just as the circumstances of the roof permit.

A friend of ours, and an enthusiastic student of nature, Henry T. Martin, Esq., of Albany, has probably the best and most scientifically arranged glass-room in this country, as far as, in accordance with our previous remarks, the circumstances of the original structure would permit. The description of this glass-room will yield more essential service to our readers than that of any theoretic glass-room of our own recommendation; because the former has been arranged out of an already existing floor next the roof.

The side of the roof faces the north nearly; the skylight and the side-light are continuous to within a foot of the floor of the room, forming an obtuse angle at the eaves of about 120 degrees; the side-light commences about a foot before the skylight reaches as far as the eaves, so that it is slightly inclined from the perpendicular. There are seven rows of glass in both these lights, each a foot in width clear. The glass is coloured with a coat of blue paint free from all gloss. These windows are constructed in a way which renders them water tight.

The following is Mr. Martin's highly to be recommended method of accomplishing this plaguy difficulty. The ledges of the window-frame on which each pane of glass rests has a grooved furrow all the way down and out at the bottom:—

Fig. 1.



Let A, B, C, D represent a cross section of one of the bars of the window-frame, F is the grooved furrow, N the pane of glass as it lies upon the ledge, and O is the putty.

The connection between the panes of glass is also quite peculiar. Each pane is cut obliquely at one end in such a manner as to overlap the pane beneath it by one half-inch at one side and a whole inch at the other side. These arrangements are intended to allow the rain water to run down the oblique edges, and by capillary attraction to collect in the channeled furrows, by which it is carried to the ground in continuous small streams. The plan turns out quite successful.

But the skylight and the side-light are supplied with two sets of sliding curtains, of different degrees of opacity, for shutting out more light when necessary, and for thus bringing it more under control.

The background has a uniform drab or blue colour on one side and white on the other, and is placed at some distance behind the sitter; the side screen, placed opposite the window and swinging on a central axis, may be moved about and placed in the most appropriate position as occasion requires.

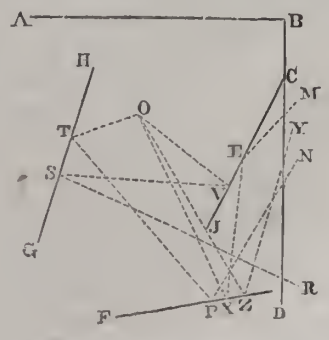
The motion on the central axis is intended to reflect light upwards into the dark cavities of the eyes and beneath the nose, lips, and chin, &c.

The chair for the sitter is elegantly formed and covered with green woollen stuff.

In order to carry out the idea we entertain for producing agreeable relief in the photograph, we require in addition two extra screens of the same size and arrangement as the one opposite the window, of about four feet wide by six feet high.

The annexed diagram will illustrate the complete arrangement and adjustment of the three screens in reference to the background and side window:—

Fig. 2.



Let A B represent the background, B C part of the side wall, C D the side window, H G, C J, and F Z the three

* We scarcely agree with our esteemed contemporary in his estimate of the advantages of a blue studio.

screens, and O the sitter. The camera is placed either in front of the screen F Z or behind it; in the latter case an aperture is made in the screen to admit the passage of the lens.

The light immediately above the sitter, as well as all the way to the background, is well screened off; over and in front of the sitter it is softened down by means of blue gauze curtains. By this arrangement light may be modified to an almost infinite degree; in the first place we obtain a soft *front* light from the ray Y Z and Z O, after a single reflection from the blue screen F Z; by two reflections the ray N P, P T, and T O reaches the *side* of the sitter; this ray is less intense than the preceding, because it has been reflected twice after transmission through the window. A small quantity of light after two reflections may be made to strike the *other side* of the model by means of the ray M E, E X, and X O, as also by R S, S V, and V O; and a still more feeble side-light after three reflections will reach the sitter by means of rays reflected first from F Z, then from H G, and finally from C J upon the model at O.

From this analysis it becomes evident that there is a gradual diminution in the intensity of the light from the front of the model at O backwards. This condition is one cause of relief. In addition, all deep shadows in the cavities of the eyes, under the nose, ears, chin, hair, &c. will be entirely obviated; light and shade will blend gradually into each other, and thus form no lines of demarcation between each other, as is apt to be the case with a single or even two bright lights, and this because of the felicitous mode of reflection and the photographic light used in exclusion of all luminous rays. The background, being less illumined than the sitter, will cause the latter to stand out from it, and not to be embedded in it, of which evil we have but too many examples.

By means of small strips of light in the side wall at C, or behind the over-head screen, the background itself may be so illumined in patches as to produce an artistic effect either on the background and accessories or upon the model by reflections from its surface.

But the college bell is ringing; we must postpone all further expatiation on this subject. Now for sines, cosines, and tangents.

THE ART CLAIMS OF PHOTOGRAPHY.*

No one disputes the scientific value of photography; but when we come to its claims and position as one of the fine arts, we enter upon rather less peaceful territory. This is no matter for surprise, whatever the merits of the case may be. The ground is fully occupied. Any who claim a place in it must do so to the detriment of some who are already there. New comers are seldom popular with those whose room they occupy. And the feeling appears to be peculiarly bitter in cases where the old-established favourite has to give way to some new-fangled device, which has been introduced in the natural course of things, as the world advances. It is not surprising that bad artists should have lavished upon photography a good deal of the contempt which some thirty years ago coach proprietors used to expend upon the dangerous and inconvenient system of travelling by railway. The penalty of being thought *parvenu* and illegitimate by those whom it supplants, is a penalty which every new discovery must pay for its novelty, and which, perhaps, is a salutary ordeal to distinguish genuine improvement from wanton innovation. However, this standing jealousy of new favourites, which is always entertained by the old, is not wholly adequate to account for the zeal with which the claim of this upstart science to rank among the ancient order of the fine arts, has been combated. There are many causes in operation peculiar to the case of photography. Among them must in justice be admitted the shortcomings of many of its professors—which, in other words, means the shortcomings of the multitude whom it is their function to satisfy. Whatever our merits as a nation may be, we are not distinguished as worshippers of the beautiful; and any art which appeals to the eye in England will by no means become more elevated in proportion as it becomes more popular. An art which is fortunate or unfortunate enough to attract but a scanty circle of educated admirers, may maintain the loftiness of its standard unimpaired But an art which lives by the patronage of the million will adapt itself to the million's tastes. In theatrical phrase, it will "play to the galleries." The enormous demand which has sprung up for photographs has produced a vast amount of detestable photography. The skill required for the production of a bad portrait is not beyond the reach of an ordinary artisan; and the small capital with which it is necessary to begin produces a rich and rapid return. The result of course is, that numbers are induced to take it up, and make a good livelihood by it, who work it in the spirit of simple mechanics. They practise it that they may live by it, and they ask from it no other result than that it should pay. Abundance of customers is the only ideal they pursue. That the works which such practitioners turn off should claim to be works of art, is, no doubt, enough to raise the bile of any fastidious artist. But photography is not the only profession which includes both a high and low range of merit; and it is not the only one that would suffer in estimation if it were judged by the misdeeds of its hacks and drudges. It would be as sensible to condemn poetry because of Grubb Street, or to cashier Thalia and Euterpe from the rank of Muses, on account of the musical and dramatic doings of the "Surrey side." The art must, in fairness, be judged by its ornaments, and not by its disgraces.

But there is a deeper cause yet which impedes the recognition of photography by the select few who know themselves as "persons of taste," and which must continue to do so for many years to come. Admiration is, to a great extent, a matter of education. In the case of far the larger number of people the eye admires only that which it has been habituated to admire. Want of practice will prevent the mind from dwelling on, and, therefore, for all practical purposes, from seeing the beauties for which it has not been taught to look.

It is not in the least degree likely that photography will ever dethrone painting from its present pre-eminence. The good painter's resources are so much larger, his power of interpretation so much freer, that he will always command more admirers than the best photographer. But it is likely that the admirers of photography will increase in number in proportion as the results of the art become more familiar. Its beauties are special to itself, and hardly come into competition with the true beauties of painting. The ground it occupies is limited; but on that ground it is unapproachable. But its excellence depends on shades of difference, which will seem large or trivial according to the familiarity of the observer. To an art-connoisseur of the present day, the differences between good and bad photography appear inappreciably minute, for the same reason that the ease with which a huntsman recognises his hounds apart, or a shepherd his sheep, seems inexplicable to an observer who has never had much to do with either. The magnitude of the intervals in a scale of merit is a purely subjective question. It depends entirely on the power of discernment which the observer's own mental experience, and the current habits of thought of the world around him, have given to him. Now painting has all the advantage in this respect which complete familiarity can give. It has been before the modern world for some five centuries. The merits which attach to pictorial representations of natural objects—putting aside the question of the ideal for the moment—have been familiar to fifteen or sixteen generations of admirers. The sensations of pleasure which are produced by effective composition and harmonious colouring have been felt by numberless minds, and have been so closely studied and analysed, that the gradations of merit are easily recognised, and the minds of artists have become very sensitive to excellence. An ordinary connoisseur of the present day can detect defects and can feel beauties which would have produced but a dull impression on the mind of a contemporary of Cimabue. An art has not had a fair trial until it has had an opportunity of appealing from the neglect of one generation to the verdict of the next. It must educate, not only those who are to practise it, but also those who are to enjoy it.

Time will do this service to photography. It is obvious that the want of colour will always be a great drawback. But it has much to offer instead, which, though not a full compensation, deserves to be rated higher than it is by many at the present day. The gradations of light and shade, and the exact form of the object it depicts, are rendered with a delicacy and a fidelity

* From the *Quarterly Review*.

which the painter cannot even approach. It is natural that these beauties should not be fully recognised by the mass of the art-critics of our day. They have not been wont to look for these things. The art with which they are familiar has not them to offer. The brush or the pencil are instruments far too rough to reproduce with truthfulness the beauties of form, and light, and shadow, which Nature lavishes on every side, and those who have learnt all their canons of admiration from the works of the brush and pencil naturally pass such merits by in ignorance or contempt. The balance of light and shade, the exact adjustment of the prominence due to each portion of the picture, is a peculiar beauty of the art, which seems to attain to greater and greater excellence with each succeeding year. Those who talk of photography as something purely mechanical would be surprised to know how much the attainment of this excelleuce depends upon natural gift, adroit manipulation, long experience, and careful study of nature. As these qualifications are brought to bear on it more and more, it may be expected that finer results still will be obtained. Such results are as much the work of the artist who produces them, as the results that are produced on canvas. They depend quite as much upon individual skill and perception of beauty. The only difference between the two cases is that one artist works with brush and pigment; the other by timing his exposure, and by judgment in compounding and applying his developers and intensifiers. And the pleasure given is the samo in kind. It appeals to the same sense of beauty. No reasonable person anticipates that the time can ever come when even the most exquisite transparency in monochrome will give as much pleasuro as a first-class painting. But when the power which photography confers of dealing with light and shade has received the recognition which greater familiarity will procure for it, no one will deny its title to be ranked as a fine art.

Its exact rendering of natural form is more generally acknowledged. But it is a curious illustration of the extent to which the art of painting has had the opportunity of moulding public taste to its own necessities, that this exactness which the paint-brush and the pencil cannot attain, has actually been made a reproach to the photographer. Some persons appear to entertain the idea that the superiority of a fine landscape painting over a fine landscape photograph is due not entirely to its colour, but to the fact that the indistinct and faltering outlines do not distract the eye or turn it from the nicety of the entire design to the contemplatiou of minute detail; and, quite consistently, they treat the inevitable imperfection of the lines of a chalk or pencil drawing as a positivo beauty. So far has this view been carried in a few cases, that somo photographers have been found to prefer an old process called the wax-paper process, in which the negative was taken upon waxed paper, instead of upon glass, and in which eonsequently tho positive print was disfigured by all the uncertainty of outline due to the confused texture of paper through which it is printed. To that extent it was necessarily rather moro like an artist's drawing. In other words it resembled an artist's drawing in its defects. But tho word "artistie" has a magic power; and there were many people at one time who were quite satisfied that they had settlod the question, when they had decided that wax-paper was the moro artistie of tho two. Another curious mental confusion of the samo kind in reference to portraiture still prevails occasionally under the influence of the samo potent word. There are some photographers, and more photographic critics, who are of opinion that a photograph cleanly taken, and properly focussed, is "inartistie;" and if asked why they pass upon it this terrible coudemnation, thoy will reply, taking refuge behind another word of power, that it is "realistic." Tho complaint is too vague to be liable to criticism. But the remedies are very curious, and betray how blind and unreasoning much of our connoisseurship is. One critic recommends that the sitter should move slightly whilo the portrait is being taken. That critic can never have stood behind a camera. The result of the nostrum would undoubtedly be to banish tho realistie, but whether the effect would be artistie may be questioned. The simple consequence of the remedy would be that tho sitter would bo presented to the world with an elongated mouth, two noses, or one nose the size of two, and eyes squinting outwards. Another more popular remedy for this supposed defect is to throw the focus of the lens not upon the sitter, but to a point behind him. This device, no doubt, effectually disposes of all undue exactness of outline. The lineaments of the unlucky sitter are invested with a blurred, hazy margin, which is presumely "artistic," but which makes him look much as a man looks who is standing a few feet off in a thick white fog. But this is not the whole of the metamorphosis which he has to undergo in order that he may be rescued from realism. All points which fall short of that to which the lens is focussed are not only blurred in outline, but exaggerated in dimensions, and that iu proportion as they eomo nearer to tho lens. Tho eonsequence, therefore, of throwing the focus behind the sitter is that all that part of him which is nearer to the lens is violently exaggerated. If he is standing full face, or nearly so, the tip of his nose widens out, and becomes a respectable "bottle" at the tip, his stomach swells to an ungraceful convexity, and his shoes give unmistakeable evidences of gout. If he be standing sideways, it is his hand that swells, and his fingers become elongated to the proportions of a well-grown gorilla. It is an insult to art to call this kind of manipulation artistie. The Madonna del San Sisto is supposed generally to have been the work of a fine artist, and probably is instinct with as much of the ideal as the genius of man will ever convey to canvas. But Raffaello did not find it neeessary to put the child into a white fog, or to enlarge the end of the Madonna's nose. Tho indistinctness of artists' outlines, which is found chiefly in the work of chalk or pencil, is simply due to the coarseness of the materials and instruments that are used. It cannot be imitated in photography by any screwiug of the lens. If it could, it would much resemble the imitation by which George I. cultivated the tastes of his youth, when he ordered the English natives to be kept for a fortnight, that they might equal in pungency and flavour the oysters in which his soul had been wont to delight at Hanover.

There is one department of art into which at first sight it would seem that photography never can intrude. Its function is apparently restricted to the representation of scenes or persons that have actually existed. No one would imagine that its powers could possibly be extended to the ideal, or that it could ever serve to give form and body to the conceptions of the brain. Yet even this, the painter's special domain, has been invaded. A few photographers, of whom Mr. H. P. Robinson of Leamiugton is the most activo worker, have made an effort to possess themselves of the pencil of the Sun, and force him to work out their own imaginations. They have tried, and to a great extent they have been able, to use the lens for the purpose of expressing pictorially their own feelings or ideas. The simplest and most limited form in which photography can be made to interpret an artist's thoughts is, of course, by selecting a subject in accordauce with the idea to be illustrated, and collecting the appropriato accessories, and distributing them so as to produce the best effect. The most obvious instanco of this mode of proceeding is the practice pursued by almost every portraitist of surrounding his sitters, by the help of the sceno painter, with accessories befitting their known occupations. In a more legitimato manner the samo plan is adopted by most photogrophers who pay any attention to the æsthetic value of their compositions. But Mr. Robinson has carried the idea much further than this. In his finished picture he contrives to put together objects which are not together before the lens. Each individual object in the picture is delineated from nature by tho sun; but the collocation is purely arbitrary. This result is attained by a plan of printing called double printing. It is done in this manner:—Supposing that the picture which the artist has designed in his head is to contain six figures, a cottage, and a bit of a landscape, and supposing that he cannot get any of these objects together beforo his camera, he solves the difficulty by taking them all separately upon eight different negatives; the figures of course being posed so as to suit tho plan of his composition. Then he paints out with a black varnish every part of each negative except that which is to enter into his picture. Then he exposes his sensitivo paper uuder each negative in succession; each of course being carefully fitted so as to leave its portions of the composition in their proper placo upon the paper. When the paper has been exposed under all the eight, the print, thus, as it were, compounded, is toned and fixed like every other print.

There is no doubt that Mr. Robinson has produced some very beautiful pictures by this ingenious and laborious process; but his success has not prevented an energetic controversy both as to the legitimacy of the plan, and as to its artistie value. Its legitimacy hardly seems to us to need much discussion; for it is in fact no more than what is done by almost every artist, who, when he sees any object or figure whose beauty strikes him, sketches it in his sketch-book for future use when occasion offers. With regard to its artistic value a more qualified ad-

mission must be used. So far as the beauty of a picture, or its meaning, or its poetical power, depends upon composition—upon the selection and arrangement of inanimate objects, or the attitudes of living beings—so far there is nothing within the reach of the artist's pencil which is not equally within the reach of photography by double printing. For it would be hazardous to maintain that beautiful objects cannot be obtained as effectually by selection as by invention. Such a position would involve the doctrine that as much beauty cannot be found in actual nature as can be evolved out of an artist's brain. And the beautiful objects once found, the photographer can arrange them as freely to his own taste as the artist. But the great instrument by which the painter expresses thought and feeling, and awakens human sympathy or reverence, is not brought nearer to the photographer's grasp by these contrivances. The varying expressions of the human countenance are at the painter's disposal. Through them there is no thought or feeling to which he cannot give utterance; no chord of emotion which he cannot strike. From this, the loftiest region of the domain of art, the photographer is shut out. No industry in searching, no taste in selecting, can find for him the speaking features which a painter can create, or mould them as the painter can to express the conceptions of his own mind. Where such an attempt is made by the photographer, and is even distantly successful, the success is due not to his poetic genius, but to the dramatic power of his model.

Proceedings of Societies.

The London Photographic Society.

The first meeting of the winter session was held at King's College, on the evening of Tuesday, Nov. 1st, J. Glaisher, F.R.S., in the chair.

The minutes of a previous meeting having been read and confirmed, Mr. H. Oakley was elected a member.

The Chairman called attention to some fine photographs of microscopic objects by Dr. Maddox, published by Mr. How, and said that the Society would be much obliged to Dr. Maddox, if he would give them some account of his method of producing such excellent specimens. He also took an opportunity of expressing his regret that the Society did not occupy the position it ought to do. It was not satisfactory that, at the termination of a long vacation, they should open without a paper of any kind. He hoped members generally would co-operate with the council to bring about a better state of things.

The Chairman then called attention to the prospectus of the Dublin Exhibition, which had been brought before the Society by Mr. Peter Le Neve Foster. Photography was to be represented there, pictures in the fine arts class, and apparatus amongst philosophical instruments. He hoped photographers would aid in securing a proper representation of the art. He also called attention to some fine specimens of landscape photography by Mr. Brownrigg, secretary to the late Dublin Photographic Society. He also called attention to some enlarged specimens which he thought very fine, and asked Mr. Dallmeyer to state particulars.

Mr. Dallmeyer said the specimens were by Dr. Van Monckhoven's new enlarging apparatus, which had been described in the journals. He thought, on an examination of a print from the original negative, 4 by 3, of an architectural subject, and then at an enlargement of ten diameters, it would be seen that the results were very good; better than could have been obtained with a large lens direct.

Mr. Squire, at the invitation of the Chairman, described the purpose of the enamelling process, of which he exhibited some fine specimens. The pictures were improved, and he believed their permanency increased.

Mr. Window at the request of the Chairman, explained his purpose in the production of the Diamond Cameo portraits he exhibited, which was to get rid of the vulgarity which too often attached to the ordinary card picture, and by the facilities which such a method offered to obtain easily a good expression. The convex form, as would be seen, added much to the effect of relief.

Several specimens, together with a negative, were exhibited, and a camera prepared for taking the four heads was exhibited by Mr. Dallmeyer.

The Chairman called attention to the new uranium, or Woth-lytype prints on the table, and regretted that they had been disappointed as to a paper on the subject for that evening.

The Secretary (Dr. Diamond) then read a letter from Mr. Brown, of the United Association of Photography, stating that the directors having that day discussed the question of licences with the editors of the photographic journals, whom they had invited as representing the photographic public, to state their views on the subject, they had, after mutually considering these suggestions, resolved to charge one uniform rate of £10 for licences, for the whole period of the patent, and that from Monday next, until the 7th of December, their studio in Regent Street would be open to show licences the whole of the process. In regard to amateurs, the question of terms was not quite decided, but they hoped to announce liberal terms in the journals of this week.

Dr. Diamond also read a letter from Mr. Tunny, of Edinburgh, from which the following is an extract:—I have been all out of breath, so to speak, in anxiously waiting the disclosure of the "Wothlytype," but I suppose we are destined to remain somewhat longer in suspense; in the mean time, I have not been idle. I have been endeavouring, if possible, to ascertain what can be made of uranium, as that is the hinted-at salt, in combination with other metallic compounds. I have, in the first place, got very vigorous prints by the nitrate of uranium and chloride of gold; also good results with the uranium and silver; perhaps as good as any have been the results of the ammonia-phosphate of silver; all these, and many others that will suggest themselves, give very vigorous prints, simply combined with collodion; but there is the drawback of want of sensitiveness, taking nearly double the ordinary time to print; however, the weather has been very bad for conducting my experiments. I cannot, as yet, give the definite formulæ for the above, as I have used them in every conceivable proportion; but if any of your readers will take, firstly, half an ounce spirit of wine, add nitrate of uranium (as much as it will dissolve by long and continual shaking), now add half an ounce of ether, three grains chloride of gold, six grains gun-cotton, they will have a collodion that will print by its being simply poured over a sheet of paper laid upon a piece of glass. The prints are fixed by being placed for a few minutes in a bath of water slightly acidulated with nitric or oxalic acid. Secondly: The phosphate of silver being dissolved with the smallest quantity of ammonia, just sufficient being added to re-dissolve it, added to ordinary plain collodion, in the proportion of six grains to the ounce, makes a very sensitive printing collodion. Thirdly: Nitrate of silver three grains, dissolved in a drop or two of distilled water, added to the first; or uraninmized collodion, *without the gold*, also makes a good printing collodion. If the above be at all suggestive, or of any use to the readers of the journal, they are at your disposal. When the weather clears up, I shall follow up these experiments, and if anything turns up I shall be glad to let you have a few notes.

The prints having been examined with interest, no discussion followed.

Mr. P. Le Neve Foster said the prints were certainly very beautiful. Their permanency could only be tested by time.

The Chairman said he had examined a uranium print without silver, done two years ago, which was as bright as when it was done.

The Chairman then called attention to the presentation print, which was now ready for distribution. It consisted of a copy of the beautiful composition, "Bringing Home the May," by Mr. Robinson. Before closing the meeting, he would again urge upon them the importance of infusing more life into the society. The society ought to hold the highest position. Its journal ought to be the first journal of its day. He hoped that every one concerned would give the matter attention, and by a strong pull all together bring about that improved state of things which was desirable.

After some votes of thanks the meeting adjourned.

Correspondence.

PHOTOGRAPHY IN GERMANY.

Permanency of the Wothlytype—Cracking and Dissolving Films—Reversed Negatives &c., &c.

Sir,—The Wothlytype is a subject which has occupied our photographic society already for a long time. Mr. Wothly

had sent to the society ten very fine prints six months ago, and I have made some experiments in regard to the permanency. In the month of April, I placed the prints with some specimens of silver prints in water, with a few drops of hydro-sulphate of ammonia. In a short time, the silver prints were changed to a disagreeable yellow colour, but the Wothlytypes were only a little changed by the solution, and had received a trace of light yellow colour. Some other specimens of Wothlytypes I put in the same time with a good silver print, in a solution of iodine, in iodide of potassium. The silver print disappeared in a short time, but the Wothlytype was only a little changed on the edges, but after having dissolved the enamel. with which the Wothlytype was coated the print acquired a brown colour in the solution of iodine, without disappearing totally.

In regard to these experiments, I believe that the Wothlytype are more durable in the presence of sulphuretting agents, and against iodine, than the silver prints.

Mr. Sehlater, from Dorpat, has written to me that a Wothlytype, which he had had for several months, has changed its very fine colour to a disagreeable yellow. Mr. Wothly tells me that the cause of this phenomenon was a trace of a combination from uranium and lime, which has remained in the paper after an insufficient washing of the prints.

Mr. Wothly has been here recently, and I have made myself, under his direction, some prints after his process, which is very easy; but I fear with you that the price of salts of uranium might from great demand become greater than the price of silver.

You have written in your journal on the vermicular cracking of the film. Mr. Petschler had observed this phenomenon only on patent plate glass, but never on flatted crown glass. The size had here not any influence. The best manner to prevent that evil is, after the experiences of many photographers here, is filtered gum-water in the proportion of one part of gum to thirty parts of water, applied after the last washing of the plate before varnishing.

Messrs. Niekel and Vogt have prepared in this manner many thousands of plates on patent plate glass in the last four years, and have never observed the evil occur on these plates.

Dissolving films when varnished is a phenomena which I have seen first two years ago in the establishment of Mr. Günther. To prevent this evil I have diluted the employed varnish with water, 20 drops of the latter to 200 centimetre cube of the first, and warming the varnish for redissolving the precipitate produced by the water.*

Mr. Severin, of Hague (Holland), member of our Photographic Society, had tried a finished method of producing inverted negatives for the carbon process. He puts the sensitised plate in the chassis inverse, the film backwards, and screws the lens backwards a little for the amount of thickness of the negative plate.

The same gentleman had made some very fine carbon prints, nearly as good as those which I have seen from Mr. Swan. but prepared after another method than Swan's and Poitevin's. I shall send you a specimen of these carbon prints in the next.

The Photographic Society of Berlin increases with great rapidity; it has members in all parts of East Europe, even in East India, United States of America, &c.

Some very interesting communications from this Society will be sent in my next letter. Dr. Hermann Vogel.

Berlin, October 28, 1864.

* But I believe the best remedy is gum water, proposed in the Photographic News; it prevents (how, you see in my foregoing communication) wo evils, the cracking and the dissolving of the film.

Photographic Notes and Queries.

Swan *versus* Wothlytype.

Sir,—When Mr. Swan made his discovery of the carbon process, he at once made it known to the profession, and most liberally gave us amateurs permission to use it; he was equally liberal to those who might use it for business purposes, as a reward for his generosity, I sincerely hope his process will prove to be the one that will stand the test of ages, and supersede all others.

Now for the Wothlytypo; have they manifested the same liberality, or given us the least idea of their process, we are doomed to wait until next March before we can purchase a copy of their "Specification." One would imagine it to be a worthless type, and if made known, few would be found willing to pay from £50 to £500 to use it for profit or business purposes, or amateurs to part with their £6 for the privilege of using it. As an amateur, I ask the Association to make it known, give us the opportunity of testing its merits, and comparing it with other processes, they will soon hear through the medium of your columns, whether it is worth the price they ask the professional protographer. Amateurs need not be afraid, they may use the process, if it is worth using, without paying for the privilege, and no thanks to the Association for their liberality, for I find in the "Law on Patents," any one may copy or make any patented article whatever for his own use, or amusement, provided it be not for gain or profit.

What would have been the state of the profession at the present time, had it not been for the amateur and experimentalist in making known their little discoveries, and reading their "Papers" at the various meetings? Why do I read your paper weekly but to see if any of my brother amateurs have found out anything useful for my guidance in the pursuit of the art.

I sincerely hope the Association will see their error, and regret that they ever proposed to charge amateurs, it was, I think, an oversight on their part, their solicitor probably was absent for his holidays when the rule was proposed, it is contrary to law and justice. Amateur.

[You will see from our first article that many of your objections are already met. We insert this letter, whilst we omit several others, because it touches a point of importance, the early or delayed publication of the process. It is probable we think that the Association will publish without waiting until the specification is issued.—Ed.]

Collodio-Albumen Plates Sensitive to Light before Immersion in the Second Nitrate Bath.

Sir,—It is generally supposed that a collodio-albumen plate, in the first stage of its preparation, is not sensitive to light, that is, after the washed film is coated with the iodized albumen. A circumstance came under my observation a few days back that appeared to be quite the contrary. I will briefly state the whole matter.

In the early part of 1862 I broke the focussing glass of my 10×8 camera, and as I was just starting for a few days out, could not stay to get a ground glass put in, I prepared a collodio-albumen plate, as far as coating with the albumen, and varnished it; this I used as a focussing glass the whole of the summer of 1862. Last spring I removed this, and put a ground glass in its place. I placed the old collodio-albumen plate upon a shelf, where it stood exposed to the light the whole of the year 1863; about February or March, in this year, I reared a negative against it, and for six or seven months they were not moved, you may judge of my surprise when, the other day, wishing to use the old plate, I removed it from the shelf, and saw a distinct positive printed upon it, the high lights very distinct, but the shadowy portions not so well brought out. I shall be happy (if you would like to see it) to forward you the plate.—I am, sir, yours faithfully, A. A.

October 26th, 1864.

[It has been held by some, that if the collodion with which the plate was prepared contained a bromide, then the film would be sensitive, even after it was coated with iodized albumen. We shall be glad to see the plate.—Ed.]

Talk in the Studio.

Obituary.—We have to regret the loss of another able worker in photography, Mr. Glover, of Liverpool, an enthusiastic amateur, and skilful dry-plate photographer, who died on Sunday last. Mr. Sayce writes to us as follows, announcing the loss the art has sustained:—Photography has lost another devoted servant; poor Glover died yesterday at 2.45, a.m. Fever, brought on by too close application to his favourite pursuit, has

been the cause. His fate should be a warning to many of our fellow-workers, who in their ardour turn night into day. In his private character, Glover was one of the most unselfish and kindly persons I have met with, possessing great ability, but like true genius unassuming, always ready to assist practically, and by his counsel many have rapidly acquired great skill.

SOUTH LONDON ANNUAL DINNER.—The annual dinner of the South London Photographic Society was held on Saturday last, at the Bridge House Hotel, London Bridge. About thirty or forty members and friends sat down at 6 o'clock to an excellent dinner. The Rev. F. F. Statham, President, occupied the chair, and Mr. Wharton Simpson, one of the Vice-Presidents, the vice chair. The chief feature of the evening was the introduction of some excellent music, glees, and songs, under the superintendence of Mr. Blanchard. Toasts were drunk, and speeches were made. Magnesium, and other metals were burnt, by Mr. Grant. The evening was altogether a pleasant one.

To Correspondents.

OLD PUPIL.—Chloride of sodium dissolves in about 2½ times its weight of water at 60, so that 1 drachm will make a saturated solution, if added to 2½ drachms of water. 2. One grain of chloride of sodium will decompose about 3 grains of nitrate of silver; to be exact, 58½ grains of the chloride to 170 of the nitrate of silver. 3. The metallic appearance between the film and the glass is generally caused by the glass having been imperfectly cleaned, and a thin layer of silver is reduced upon its surface. 4. The appearance of inclination in the floor is caused by the camera having been pitched, instead of being placed quite horizontal. 5. A number of causes will tend to prevent density: a thin collodion, a weak light, &c., &c. You must enter into more detail to enable us to help you. In making the chloride of sodium, of course, you must evaporate and crystallise.

SWEET BEEF.—(What a *nom de plume!*) Your "gutta percha dipper" is probably made of iron wire covered with gutta percha. In such case, if a portion of the iron became exposed by some imperfection in the gutta percha coating, it would produce the result you describe; a reduction of metallic silver, and a brownish discoloration of the solution from oxide of iron. 2. You do not explain why the recent remarks in the NEWS do not apply to the negatives you name. From the brief description, we should think that yours was simply the well known form of vermicular cracking.

M. P.—Pyrogallic solutions are generally deteriorated when discoloured. The use of iodine, pyro, and silver, will generally obtain intensity in the most obstinate cases. For details, see your copy of the YEAR BOOK.

W. S.—There is no reason why you should not use tannin plates prepared after Mr. Hughes' method for transparent positives. Acid development will in such case probably give the best results.

ADAM STELFOX.—A good varnish for glass positives may be made by dissolving mastic in benzole. The colour will adhere well to the surface. There is some difficulty, however, in getting good samples of benzole suitable for the purpose, so that you will probably find it better to purchase a varnish. Newman's positive colouring varnish, or the alahastrine varnish, which used to be sold by Squire, will answer well.

A NEWCASTLE SCOT.—You will risk having a very direct front light in plan No. 2; but it is possible that by means of curtains, you may manage it. We should prefer No. 1, if it could be made to answer the purpose. You might use a lighter background, or incline the background a little forward at the top.

J. STUART.—We forwarded the letter, but have an impression that the gentleman for whom it was intended, has given up enlarging.

AN OLD HAND AT URANIUM PRINTING, AN AMATEUR WHO CAN'T ABIDE A PATENT, F. L. M., H. C., F. S.—The arrangements have been considerably modified, and it is probable that those photographers who desire to work the process will be satisfied therewith. See our first article.

OCKOLA.—You are somewhat awkwardly hemmed in with buildings all round, which will make it difficult to get as good a light as possible. We scarcely see how you can satisfactorily utilize your glass top. We should be disposed to adopt some such plan as this:—Make a frame eight feet high and the same wide, for your background. To the top attach another frame projecting about five feet, cover this with canvas, to form a canopy, to protect the sitter from direct vertical light. To each side of the background attach wings projecting five feet, also covered with canvas, to regulate the light at the sides. Let the whole be coloured a quiet light grey. You can move this arrangement round in any direction, so as to always protect your sitter. This will be more useful, and probably cost less than the plan you contemplate.

ST. DENNIS.—We prefer the position of No. 2. In order to form an opinion as to the lighting, we should have had an elevation as well as ground plan, and also a little more detailed description.

SWANOLEYS.—Operating in a freshly painted room will sometimes cause fogging. Burning a spirit lamp with methylated spirit would not, we think, do any harm. 2. A glass vessel which has been used for hyposulphite solution may probably be cleaned sufficiently to permit its use for a silver solution. Use a little nitric or sulphuric acid, and wash very thoroughly. As a rule, however, we should not recommend the use of vessels which have ever contained hypo solutions for silver solutions, as there is a little risk. 3. There can be no reason why your left hand picture in a stereo negative should be darker than the other. Why it *is* so is difficult to say. It might be because one lens was quicker than the other: but it does not seem to proceed from that cause. Possibly one end of the plate gets dryer than the other before immersing in the nitrate bath; possibly in developing the developing solution and silver are allowed to remain chiefly on one end of the plate. We have noticed at times that little points of manipulation like these will make a difference in the character of the two halves of a stereo negative.

AN AMATEUR.—We have given the details of enlarging processes repeatedly. They are too lengthy to insert here. You will find a chapter on the subject in our ALMANAC. In our present number you will find a description of an enlarging camera.

P. M.—Decidedly No. 3.

A. G.—The general plan of your room seems good; but we should have preferred the glass carried a little further in advance of the sitter. For solar camera work a room with a south window is desirable, and it is probable that the dressing room will be most easily made available. We prefer plain crown glass. The ribbed glass should not be used except for an aspect where direct sunlight may be troublesome. The top light and side light should form one continued light, and not be divided by a foot of slates. Double sets of blinds; one white and the other dark blue. Provided the glass is thoroughly nonactinic, you may have the whole of the lower sash of dark room glazed with it. We cannot undertake to write private letters on subjects of this kind, our time being more than fully occupied already.

W. C.—The stains upon your print are such as would have been produced by dropping pieces of chloride of lime upon it whilst in the washing water. The film of the negative appears to have been partially dissolved by the varnish.

E. SAWYER.—The instantaneous pictures received are very good indeed; the moving figures are very sharp, and indicate a very rapid exposure. Comparing them with good street views in London, where the atmosphere is probably about as smoky as that of Newcastle, we may say that, so far as we can judge, they are about equal. We could compare better with paper prints however. We should be glad to hear more particulars regarding your method.

E. COX WALKER.—We will give your suggestion our best consideration.

NITRATE BATH.—The heating of a stove pipe covered with coal tar in your dark room would be likely to injure your baths and cause fog. Neutralize, sun, and filter; and in future keep the dark room free from all kinds of fumes.

J. T. B., Barnard Castle.—Bromide of cadmium is the most soluble bromide, and is therefore best suited for making bromized collodion. Bromide of ammonium is soluble in alcohol, but only sparingly. You will be able to dissolve sufficient bromide of cadmium without difficulty. We must ask our correspondents to look to this column of the NEWS for answers to their questions, as we have not time to write private letters on such subjects.

J. C. L.—We believe that most of the dealers in photographical instruments, supply microscopic slides. Negretti and Zambra, Murray and Heath, Horne and Thornthwaite, How, and others. Dr. Hill Norris can probably aid you better in regard to his dry plates than we can, since the mode in which they are prepared is not made public. Pinholes in dry plates occur from many causes; dust, particles from the box or dark slide in which they are kept, the use of common water to make developing solutions, the decomposing of the pyro and silver whilst developing, &c. &c.

A CHEMIST'S ASSISTANT.—There are various modes of transferring positives from glass to leather, but all require a little practice to prevent failure, and to make the process a certain one, it is important that the collodion be of the tough horny kind, as a powdery film is difficult to remove. The following is a simple method:—Add ten drops of nitric acid to an ounce of alcohol. Pour this over the picture until it is well moistened. Take a piece of black patent leather, and treat it in the same way; then press the two surfaces into firm contact, say in a pressure frame, and leave for an hour or so, until dry. The leather, on being lifted away, will bring the collodion film with it from the glass.

FRANCIS BONOMI.—The difficulty of obtaining paper free from imperfections, for solar camera work, has been felt by all who have worked in that direction. We have heard the best accounts of Hollingsworth's machine-made drawing paper. We believe you can obtain it of Rowney's, in Oxford Street. The example you forward seems very good, and we see no danger in the extra sizing of gelatine. The use of bichromate, to render the gelatine insoluble, will not do; beside the complex chemical conditions introduced, you would only create difficulties if you had a film impervious to water. Iodide alone will give you sensitiveness and vigour, but you will at times find a tendency to hardness, and to a greenish tone. Regarding the question of artificial light, possibly you cannot do better than to use the ordinary solar camera, and employ a parabolic reflector, by which the rays can be reflected as parallel rays to the condenser.

A CONSTANT SUBSCRIBER.—We cannot assist you in the matter you name. However annoying or unfair may have been the conduct of the person to whom you refer, we cannot recommend you to take reprisals by doing a thing which is wrong and dishonourable in itself.

JUSTITIA.—See our first article.

Several correspondents in our next.

Some Reviews in our next.

Photographs Registered during the Past Week.

MR. JOHN FREW, North Shields,
Photograph of Rev. Colin A. Mackenzie.

MR. JAMES ARMSTRONG, Carlisle,
Photograph (Caricature) "Saddling for the Sensation Plate."

MESSRS. HELSBY AND CO., 34, Church Street, Liverpool,
Two Photographs of Rev. W. Griffiths.

MR. J. H. KAY, 57, Argyle Street, Glasgow,
Photograph of Rev. Hay, Govan.
Photograph of Rev. Brown, Rutherglen.
Photograph of Rev. Clokie, Glasgow.
Photograph of Rev. Dr. Leishman, Govan.
Photograph of Rev. Dr. Napier, Glasgow.
Two Photographs of Rev. Robertson, Glasgow.
Two Photographs of Rev. Jamieson.

MR. F. W. EVANS, 246, Old Kent Road,
Three Photographs of Rev. Hugh Allen, D.D.

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THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 323.—November 11, 1864.

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EXPERIMENTS IN URANIUM PRINTING.

Pending the publication of the details of the new patent printing process,* it may be interesting to bring before our readers a *resumé* of what is already known, and what has already been done in uranium printing. The discovery of the photographic use of uranium has been claimed for M. Niepce St. Victor, who entered a provisional specification at the Patent Office, in February, 1858. But so far as we have any record, Mr. Burnett had given detailed experiments, and specimens of the results, at least twelve months prior to that date, and long before M. St. Victor had made any public allusion to the process. The principle upon which uranium printing is based had, however, been published many years earlier than this by Sir J. Herschel, in whose cyanotype and chrysotype processes the germ of uranium printing is very definitely involved.

The principle to which we refer should be comprehended at the outset; and we will endeavour, for the benefit of our less scientific readers, to explain it as familiarly as possible. As early as 1840, Sir J. Herschel discovered that the persalts of certain metals were changed by the action of light into protosalts, these protosalts possessing a reducing power which was not possessed by the persalts. Thus ammonia-citrate of iron, which is a salt of the peroxide, under the action of light parts with an atom of oxygen and becomes a protosalt. Now, as most photographers know, the protosalts of iron reduce chloride of gold into the metallic state: paper coated with the ammonia-citrate of iron and exposed under a negative, undergoes the change to which we have referred, but the image produced is only faintly perceptible to the eye, the image, however, consisting of a protosalt of iron. On plunging it, therefore, into a neutral solution of chloride of gold, the gold is reduced whenever it comes into contact with the protocitrate, and produces, almost instantaneously, a purple image, consisting of metallic gold. If a solution of nitrate of silver be used instead of the gold solution, an image in silver is obtained. This method of producing pictures is termed the chrysotype process.

Mr. Burnett discovered that the salts of uranium behaved in a manner similar to those of iron. The salts of sesquioxide of uranium ($U_2 O_3$), under the action of light, part with oxygen, and are reduced to salts of the protoxide (U O), and in this state possess the power of reducing the salts of silver, gold, and some others to a metallic state. The image produced consists, as will be seen, chiefly of the metal—silver, gold, &c.—which is reduced, the uranium rather acting as a reducing agent than as forming the image itself. The oxalate, tartrate, citrate, formiate, benzoate, succinate, and some other salts of uranium may be used, but the nitrate, as the most available, has been most commonly employed in experiment.

We may now briefly describe a few of our own experiments in this direction, which those of our readers interested in the matter may easily repeat. The nitrate of uranium is readily soluble in water, and all our earlier experiments, made some seven or eight years ago, were performed with aqueous solutions. We shall confine our present remarks to experiments made within the last month, with collodion as a vehicle, which presents many advantages, both in simplicity of operation and excellence of result.

First prepare a uranized collodion. The pyroxyline most suitable for the purpose is that which yields a tough horny film. Collodion made from the powdery kind sinks into the paper and dries quite dead. The quantity of pyroxyline will depend much upon the surface required, but five or six grains to an ounce of solvents will give a collodion which is easy to work, and gives good results. Before mixing the collodion, take the alcohol and dissolve the nitrate of uranium in it by triturating them together in a mortar. A somewhat alcoholic collodion will answer the purpose best: take then two ounces of alcohol and triturate with it about 150 grains, or from that to 180 grains, of nitrate of uranium. Possibly the whole may not be dissolved, but a saturated solution will be obtained. To this add eighteen grains of pyroxyline and one ounce of ether; agitate, and leave to settle. This constitutes the uranized collodion. Those who have not facilities for making collodion may take any sample of commercial plain collodion, providing it give a glassy, tough film. Make a saturated solution of nitrate of uranium in alcohol, and add of this from one-fourth to one-third to the plain collodion.

We have laid some stress upon the use of pyroxyline giving a glassy film because, in making our experiments, we have made two or three samples from cotton giving a good negative collodion, but which has dried dead, and in some instances opalescent when applied to paper. It will probably be found also that the sizing of the paper by some substance—probably gum tragacanth would answer—which may retain the collodion on the surface, will improve the result very materially.* In our experiments we have used the ordinary photographic paper, medium *Saxe* and *Rive*, without any preparation. On the latter the collodion is retained pretty well on the surface, but iron spots are troublesome; with the *Saxe* the collodion is absorbed considerably.

Pin a piece of paper, say whole-plate size, by three corners on to a piece of board, a trifle narrower than itself, allowing the paper to project a little over the bottom edge. Now pour the collodion on to the paper, just in the same manner as in coating a glass plate, pouring back the surplus

* Since this article was in type, we have received authority to publish the details, which will be found in another column.

* In preparing paper so as to keep collodion on the surface, two or three things require attention. India-rubber or gutta-percha would not answer well because the collodion would exercise some solvent action on them, and so penetrate. Gelatine or similar substances form compounds with silver, and would not answer where silver is used. Probably gum tragacanth possesses the balance of advantages.

into the bottle by the unpinned corner; and then hang up to dry. When dry, expose under a negative. The time will vary not only with the light and negative, but with the treatment which is to follow. For the first form of treatment we shall describe, let the exposure be a little less than for excited albumenized paper, say ten minutes in sunlight. On examination, a faint image will be discernible, the action of light having slightly darkened the nitrate of uranium. Wash for a few moments in distilled water, and then plunge into a 30-grain solution of nitrate of silver. The effect is very striking; a vigorous image flashes out immediately, the complete reduction of the silver taking place within a minute or two at furthest. If the exposure have been correct, a vigorous bright image will be the result, varying in tint according to the quality of the negative. A soft negative requiring short exposure we have found generally yields a print of delicate bistre tint; a more brilliant negative will yield tints varying from chocolate brown to purple. An under-exposed picture does not yield a tint deeper than bistre in any part, whilst an over-exposed print will yield a deep, almost black, tone of purple brown. The print may be rinsed in several changes of distilled water, and is finished.

Repeat the same process, and obtain a somewhat deeply printed image, after treating with silver and rinsing thoroughly in distilled water, place the print in an alkaline gold toning bath. We have used various, but chiefly an old acetate bath, made twelve months ago, but not used, in a few seconds the image is changed into a deep purple or black. Over-toning produces a steely black, which is cold, metallic, and unpleasant. The print is slightly reduced in vigour, especially if it have been in the slightest degree under-exposed. Wash in distilled water and the picture is finished.

Expose a piece of the same prepared paper under a negative and print very considerably deeper, until a well-defined grey-coloured image is obtained. An hour's exposure in sunlight will probably be required. In our own experiments, the uncertain and bad quality of light has rendered exact register of time difficult. Rinse for a moment in distilled water, and then plunge in a bath of chloride of gold containing about three grains to the ounce. In a few seconds a beautiful image of gold is obtained, varying in colour according to the character of the negative and amount of exposure, from a rich ruby tint to purple, and in some cases to a bluish black. Wash thoroughly, and the picture is completed. If the print be under-exposed the image will often, instead of becoming deeper, disappear, the unchanged, and very slightly changed uranium being soluble in chlorides, especially if any free hydrochloric acid be present. If over-exposed, the blue-black tone is produced. Chloride of gold may be mixed with the uranized collodion, but has in our hands given a grey poor image.

In all these cases the operations are simple and tolerably certain. The gradation of the image is very perfect and beautiful, and although the vigour is greatest by transmitted light, the image, in the two first cases, in many respects, of appearance as well as constitution, resembling a developed silver print; still there is no lack of vigour or delicacy by reflected light, and the prints possess considerable beauty. There are several other modes of toning, developing, or intensifying—for the operation of bringing out a uranium print has analogies to each of these processes—but we have described those we found most successful. A very prolonged exposure, immersion in a solution of bichloride of mercury, and then in a solution of nitrate of silver, gives a grey image, which we do not like. Silver and iron, red prussiate of potash, platinum, &c., may be used for bringing out the image; but it is not necessary to enter into details now.

Having tried these experiments with a simply uranized collodion, another interesting series may be tried with the metals combined, which have been used separately. Take the uranized collodion and add to each ounce from three to ten grains of nitrate of silver, dissolved either in a few drops of distilled water or in rectified spirit by trituration in a mortar. The collodion will thus contain the reducing agent and the metal to be reduced.

Coat paper with this collodion, and when dry expose under a negative. The paper will print, giving a good visible image, as in silver printing, but of a bistre tint. The depth of the tint and the time of exposure appear to depend considerably on the proportion of silver present. With three grains of nitrate to an ounce of collodion the image was not very vigorous; and the printing was slower than with silvered albumenized paper. With soft negatives the image was weak and poor; but with vigorous negatives a good result, delicate and forcible, was obtained. However deep the printing the colour was never deeper than brown, and still of the bistre hue. If this tint be intended to be retained in the finished picture, the printing must not be carried much, if any, deeper than appears satisfactory, and a thorough washing in distilled water finishes the operation.

If a purple or black tint be desired, the same print must be exposed longer, until the image is considerably deeper. It is then well rinsed in distilled water, and placed in an ordinary gold toning bath—we used the acetate. The toning is slow, and reduces the depth of the image, which, if weak at first, does not improve in this operation. If, however, the image be vigorous and sufficiently deeply printed, it improves in the gold bath, and may be made to assume the exact tone of any ordinary silver print. It is then well washed in repeated changes of water. A better toning effect is produced by a gold bath, to which we shall refer presently.

The prints produced by this mixture of uranium and silver, most resemble, in general behaviour and effect, the Wothly-type prints, both in their colour in the printing frame, and when toned with gold.* Dr. Schnauss having analysed one of Herr Wothly's prints, states that he found iron and gold, and another analyst professes to have found gold and silver. Speculation on the subject is probably somewhat a useless occupation, seeing the details must be published ere long; but we might suggest that it is not improbable that uranium, silver, and iron may all enter into the composition of the collodion used in the patent process. Ferro-tartrate of silver was employed in one of the many beautiful experiments of Sir J. Herschel in the early days of photography, and it is not impossible or improbable, from the nature of the results then obtained, that the addition of the tartrate of uranium—the most sensitive of the uranic salts—might produce results which would well repay the experimentalist.

A question which will naturally arise, however, in regard to the greatest number of experiments we have described as to how the prints are fixed, seeing that silver enters into the operations, and, indeed, chiefly forms the image. With the exception of the experiment in which the uranic print is plunged into gold immediately after exposure, and the image formed of ruby or purple gold, all the pictures really consist of silver images, uranium simply acting as the reducing agent, as gallic acid, applied in a different way, does in the usual form of developed silver prints. How is it, then, that no fixing process is employed? The answer is, that nitrate of silver only is employed, which is soluble in water, and not chloride of silver, which is only soluble in hyposulphites, cyanides, sulphocyanides, ammonia, &c. Nitrate of silver being soluble in water, it is alleged, may be removed by plentiful washing in water.

We do not, however, think this answer satisfactory, and for several reasons. Primarily, it is a very uncertain thing whether the various samples of paper which reach the photographer are free from chlorides. It is more than probable that many samples contain quite sufficient of a chloride to combine with the silver the moment they come into contact,

* It will be seen from the specification which has reached us since this article was in type, that the Wothlytype is identical with the process here described.

and form a compound insoluble in water, which will assuredly reveal its presence in time by discolouration of the print. Again, even if the paper were free from chlorides, unless the most scrupulous care were now used to employ only distilled water in washing, insoluble salts of silver, carbonate, chloride, &c., would be formed in the paper, and prove detrimental to permanency. Again, whenever the print is toned in a bath of chloride of gold, unless every trace of nitrate of silver have been first removed by washing in distilled water, it would be converted into a chloride in the toning bath of chloride of gold. And, finally, even suppose the danger from chlorides to have been eliminated, the danger of forming organic compounds of silver from the contact of the nitrate with the sizing material of the paper provides a fresh risk of discolouration and fading.

We strongly incline to the opinion then, that with our present knowledge of the subject, we cannot safely adjudge any print to be permanent, in the production of which silver forms an element, without having been treated with some solvent of the chloride, and other salts of silver insoluble in water.

In the experiments we have made, we have therefore submitted many of the prints, produced by the processes described, to the action of sulphocyanide of ammonium. A very slight reduction in depth has been the result, but generally an improvement in the brightness and clearness of the image. The best result of all has been produced by the use of a toning and fixing bath in one, consisting of one ounce of sulphocyanide of ammonium in four of water and one grain of chloride of gold. The first result of the mixture is the production of an orange or red precipitate of sulphocyanide of ammonium, which is, however, rapidly redissolved. Argento-uranic prints immersed in this bath rapidly assume a purple or black tone, and any trace of insoluble silver salts is removed at the same time. The prints are made safe, and the general result is better.

We shall probably return to this subject, and refer to other experiments of our own, and to the results placed on record by some of the pioneers in this direction.

THE WOTHLYTYPE PATENT.

Specification.

An appeal was made in our columns last week to the patentees of the new printing process for details of the process, which in the ordinary course of law would not be made public until next March or April. We have brought that appeal specifically before the directors of the Association, and have received authority to publish extracts from the specification giving all the points of information of any importance.

It is entitled "A new Chemical Process for producing Photographic Pictures and in the preparation and manner of using the Materials in such Process." It will be seen that, putting other details aside, the really salient claim upon which the patent is grounded, is the combination of nitrate of uranium, nitrate of silver, and collodion, thus uniting in one vehicle all the sensitive salts necessary for producing a definite image under the action of the light. Each of the agents have before been used separately, and combinations of some portion of them before, but not the three combined, and it appears to be this combination which constitutes the practical novelty of the patent. We have in another article, written before we had seen this specification, expressed a conviction that where silver was used at all in printing, some other solvent beyond water would be necessary to ensure the removal of all traces of that metal from the print. It will be seen that no mention is made in the specification of any preparation for the purpose of removing the salts not acted upon by light beyond acetic acid; and from what we can glean, it appears to be the conviction of Herr Wothly, that no other fixing process is necessary. As a precautionary measure, we believe, however, that Col. Stuart Wortley has used a solution of sulphocyanide of ammonium, and that the prints upon which our testing experiments, described a few weeks ago, were made, had been so treated. Whether prints simply washed would bear similar tests remains yet to be proved. The following are the extracts from the complete specification:—

The features of novelty in this invention consist

Firstly, in a new method of preparing photographic paper, by bringing the fibrous material of which paper is composed into actual contact with the compounds or simple agents used as medium for coating such papers, thereby producing a better, smoother, and more even surface.

Secondly, in producing on a photographic paper a "matt" or "dead" surface, instead of a smooth or unglazed surface, so that when pictures are printed on such paper, thay will have a mellow and quiet effect.

Thirdly, in a new chemical compound for rendering photographic paper or other material highly sensitive, and in being able to print photographic pictures on paper or other material, to the actual intensity (in colour) required, doing away with the necessity of over printing, and allowing for reduction of intensity of colour in the bath, as is now the case.

The following are examples of the means by which these improvements in photography may be effected.

Chapter 1st. As regards the preparation of photographic paper, or the surfaces of any other material capable of receiving an impression by the action of light.

We take well-made paper, such as is expressly made for photographic use, and over the surface of such paper, with one of the well known and simple mediums, such as arrow-root or common starch, albumen, &c., &c.: or with such simple mediums as described in combination with any other compound or simple material, suitable for any special purpose, and instead of merely enveloping the surface with the solution, and then allowing it to be naturally absorbed, which will "furr" up the surface of the paper, and merely deposit itself between the fibre (as is now the case), and when dry, prevent the fibre of the paper laying down, and being properly interlocked together, in fact, assuming its original surface. We, instead of the old process as above, first envelop the surface of the paper or other materials, with the solutions, as before described, and either place it under pressure, between two polished surfaces, or subject the paper to a rubbing process by any material best suited to force the medium into, and between the fibre, and lay them in a firm and compact manner to produce, when dry, a smooth surface. Or we pass the paper between rollers especially constructed to effect the purposes herein specified; the great and important object being to incorporate the fibre again, after being fully charged, so that when dry and prepared, it will have a better surface for the production of photographic pictures.

Chapter 2. Our next novelty in photographic chemistry and manipulation, is in rendering the surface of such paper or other materials highly sensitive to the action of light, for the production of pictures from, and through the negative to the positive. Instead of using the ordinary preparations of nitrate of silver, we prefer to use preparations of another metal in combination. We take collodion prepared by any of the well known methods, to which may be added any of the gums or other mediums to produce elasticity, flexibility, and adhesiveness, preventing the edges from being defective, dependent upon the state and humid condition of the climate. To render this collodion sensitive, we add, say to one pound of collodion so prepared, from 1½ ounce to 3 ounces (or even more) of the nitrate of uranium, to which we add from 20 grains to 2 drachms of the nitrate of silver.

When the solution is thus rendered sensitive, we prepare the paper or other material (in a properly lighted room) by pouring the sensitive solution on to the surface, and then float it in the ordinary way, the superfluous quantity being poured off the paper. It is then hung up in a dark room to dry, when it is ready for the printing frame.

The above sensitive collodion thus prepared and combined,

has the following advantages over the old process (viz.,) that instead of having to print the positive to a greater intensity of colour, to allow for its reduction in the bath, as is now the case, we print the picture from the negative on to the positive paper (or other material previously described) up to its proper strength of colour. such as in appearance will be satisfactory to the operator, and then immerse in a bath of acetie acid or any other agent in solution, to dissolve the salts, which are unaltered by the action of light (which takes by this proeess, about from ten to twelve minutes). We then place the picture on a sheet of glass, under a stream of water, and rub it with a brush or sponge, or we pass it through a series of baths until it is perfectly clean. We then pass the picture in any of the so-called toning baths containing chlorides of any of the superior metals. Or the hyposulphite bath may be used or not, as may be required by the operator to produce any tone of colour, he may think best suiting his taste.

Chapter 3. If we require a photographie picture, the effeet of which will be what is teehnically termed a "matt" or "dead," and not glazed appearance. Instead of dissolving the sensitive salts in collodion as hereinbefore deseribed, we dissolve them in alcohol and water, and add any, if neeessary, of the saccharine substances. We then prepare the paper by covering it with the alcoholic and water solutions, combined with the chemical salt to render the paper sensitive.

The paper thus prepared is hung up in a dark room to dry, when it is ready for printing by the action of light.

Having now fully described, and set forth the nature and object of this invention, together with the best means we are acquainted with for carrying the same into practical effect, we would remark that we do not confine ourselves to the precise quantities herein specified, as they are required to be varied in accordance with the class of negative to be printed from, or in the manner of manipulating, as long as the principles of the invention are adhered to. What we claim as our invention is,

Firstly: The manner of preparing paper or other material as herein set forth in chapter one.

Secondly: The using of nitrates of uranium and silver in combination, by which a new salt is produced, and using them so combined with the mediums herein specified, for the production of photographic pictures, and their development, at one operation, as set forth in chapters two and three of the specification.

THE USE OF TWO PRINTS TO FORM ONE PICTURE—COLOURING AT THE BACK, &c.

We have received various inquiries during the past few months as to the details of a method of finishing and colouring photographic pictures, described as "Lee and Thompson's Patent." The description of the results and process which reached us did not enable us to identify them with any patent at the time specified. We now publish, however, in another column, the specification of the process referred to, which being described as a method of "Mounting," did not suggest at first sight its connection with the method of finishing, in regard of which inquiries were made. The subject generally of the use of two prints to produce one picture, and of colouring photographs previously made transparent, at the back, having excited some fresh attention, it may be interesting to give a brief glance at the processes which have been published in past years for effecting these purposes.

It is somewhat singular that amongst the very earliest patents in connection with photography, there have been several for methods of colouring analogous to that to which we have referred, and it is not less odd and amusing to find the same or similar processes patented over and over again. In 1852, M. Tardieire obtained a patent for colouring photographs at the back, making them transparent with varnish, and attaching them with the same vehicle to glass. In the following year, Mr. Duppa, for a process substantially the same; and during the same year, and within a month of the filing of Mr. Duppa's specification, Mr. Laverdet, for a process as nearly as possible identical with the two former methods. Subsequently, we find some patents for analogous, but varied processes; but we may add that we believe not one of these patents has been worked, so as to pay the patentee; and that in most, if not in all eases, the patents have been suffered to lapse. We believe that our American neighbours have been scarcely less prolifie in patents for this purpose, and based on this principle of colouring at the back, and rendering the photograph semi-transparent with wax or varnish. In the year 1857, the American journals contained some very enlogistic notices of pictures coloured by the "Hallotype patent" process, and we remember seeing some cleverly executed examples at the time. The following is an extract from the speeification of the patent, from which it will be seen that it is nearly identieal in its details with the method just patented by Messrs. Lee and Thompson:—

I will first illustrate my invention by a description of its employment in the treatment of photographs, to which it is especially applicable. If the picture is a portrait, two or more copies are to be taken, in the usual way, upon photographie paper, and I will describe it as applied to two. These pictures are rendered more or less transparent by the application of oil or its equivalent, and each is to be cemented to a separate plate of glass, by means of copal or other suitable transparent varnish, which has been previously applied at a time sufficiently in advance for it to become partially dry, or as it is technically termed "tacky." In applying the picture to the plate of glass, care must be taken to work out all the air bubbles from beneath, in order that it may be in close contact with the glass. Each picture is then allowed to become dry, or nearly so, when it will be well to scrape off the back carefully to remove any excess or lumps; and to leave a smooth surface. After this, one or more coats of copal or other suitable varnish is to be given, and when this is dry, the two plates of glass are to be joined together so that the lines of the pictures will coincide, in which position they must be cemented or framed together. When two back pictures are prepared for the combination, they may be cemented on opposite sides of the same glass, instead of upon separate plates as above set forth, or the imprint or photograph may be taken in duplicate upon opposite sides of the same paper or other substance proper for the purpose.

Different effects may be produced when the front picture only is excented on or attached to the plate of glass, and the second one placed behind it so as to correspond with the other; or when the front and back pictures are secured between two plates of glass, with gum gomar, balsam of fir, or similar substances, remaining in a liquid state. Colours may be applied to the back picture only, or partially to both, or so that one colour in the front picture may have a ground of another colour in the back picture.

Whilst the subject is exciting fresh attention, as we have described, in this country, a similar colouring process is being offered to photographers at the antipodes. We have recently received the following from the Australian continent:—

Sir,—Recently a Mr. Wilson, from New Orleans, introduced here a process which he called the "Sennotype," for whole-plate impressions. The process is a secret, but having dissected one I give you my experience. A whole-plate portrait, on an apparently thin plain paper, is coloured, made transparent, and firmly fixed to a sheet of glass, so that no air-bubbles, or imperfections, are to be seen on the surface, the painted side to the glass; a second impression of the same object is placed with great exactness at the back of it, which gives it great depth, softness, and beauty; it has a waxy appearance. They are then carefully bound together at the edges, and framed. The *difficulty* of this process is making the first impressions *transparent and adhesive* to the glass.

I am informed that a patent was refused to Mr. Wilson in Melbourne, on the ground that a description was given of a similar process in one of your earlier numbers; if such is the case, please forward it to me.

If it has not appeared as stated, the publishing of this letter

may direct the intelligence of your readers to a branch of the art which is a very beautiful one, and well worth the trouble of working out. H. W. Thwaites.

Macquarie Street, Hobart Town, 19th July, 1864.

The *Genie Industriel* of June, 1854. contains a very complete article on this method of colouring, by M. Minotto, and a translation appeared at the time in the journal of the Society. Colouring in this form had been applied to engravings and lithographs long before photography was discovered, and the application of the same plan to photography was a tolerably obvious thing. As from the communications which have reached us, it appears that the process is exciting some attention, a restatement of the details will probably be interesting to many of our readers. There are three modes described by M. Minotto, as follows :

First Method.—The paper bearing the image to be coloured is to be held up against the light, so that the operator may trace upon the back with a crayon or pencil, the outlines of the different tints ; that is in the case of a portrait, the outlines of the hair, the flesh, the dress, the whites of the eye, &c. ; then the proper colours are applied upon the different parts upon the back of the paper. It is scarcely necessary to say that these colours may be of any kind, either water-colour, oil, or made up with varnish, &c.

The colours are allowed to dry, and the paper covered with a varnish which renders it very transparent ; the image then appears coloured, and if the operation is well performed, it acquires the aspect of a miniature, and even of an oil painting.

Second Method.—The operation may be commenced with varnishing the paper, allowing to dry, and then colouring on the back. The advantage of this mode of proceeding is, that the sketching out with the crayon may be dispensed with ; moreover, as the effects of the colours are seen at once, they may be corrected at will. It is evident that in this process colours must be used that will take upon the varnish if the paper is thin, the outlines may be seen, and coloured by transparency, and then immediately varnished.

Third Method.—The outlines of the portrait may be drawn and traced upon a separate paper or board, and the colours be applied upon this sketch ; this is applied to the back of the paper bearing the image ; the outlines being made to coincide, and the two papers pressed together, the colours will appear through. This process possesses the following advantages over the other two :—

1st. We preserve intact, and uncoloured (though varnished) the image which was actually produced by light.

2nd. The colours may be easily corrected by painting over the original tints. In the first two processes the original layer of colour always appears, and must be removed if requisite to change it.

3rd. We may give the same image several different aspects by executing several coloured duplicates, thus changing the tint of the dress, or even if we wish, for a whim, the colour of the hair, eye, flesh, &c. We may, moreover, use the same colouring paper for various photographic proofs taken from the same negative.

4th. We may cut out the paper bearing the colours, and applying it upon several backgrounds so as to see which suits best. We may even have grained backgrounds, by dusting the background with gold, silver, or colour powder before the varnish is dry.

Although the execution of the work is in itself very simple, we think it necessary to enter into some details on this head here. For positive proofs to be coloured in this manner, it is requisite to select paper of very equal texture, and to reject any which presents a cottony, or unequal aspect when held up to the light. It is well to try some of the paper, by varnishing pieces of it.

The paper should be thin up to a certain point, so that the outlines may not be concealed. Nevertheless, too thin a paper would lead to serious inconveniences. The shadows would not be strong enough, the least irregularity in the colours would be visible, the transition from one colour to another would be too obvious, and we should not obtain that softness of tint, resulting from their fusion, produced by the veil of paper—one of the merits of this invention, an important merit above all, in regard to the flesh.

If, on the other hand, the paper were too thick, we should run a greater risk of inequality of texture, and the colours would not come out strongly enough. The author considers good strong writing paper the best.

The photographic image must be well marked, and of a tone appropriate to the colours which are to be applied to it. It is very important that the whites should be clear, and the back of the paper free from spots.

The colours must always be vivid, for their force is diminished by the veil produced by the photographed paper, and they must be more intense in proportion as the paper is thicker and less transparent. On the contrary, they must be of less force in proportion as the shadows are lighter. Sometimes weakness of the shadows may be overcome by placing two positive proofs, instead of one, over the colour. The tints must, obviously, be regulated by the nature of the object. In portraits, it is of importance to preserve the exact colours of the hair, of the cheeks, and sometimes even of the lips and eyes. It is well to lay on flat tints as regularly as possible however, as the super-position of the paper blinds them very well; inexperience leads to no great inconvenience, provided the paper is of sufficient thickness. It is most important not to overrun the outlines.

The varnish must be colourless, and such that the paper, once dry, preserves its transparency, and does not become yellow. It is well known that several kinds of varnish exist which fulfil these conditions. Mastic varnish is very good. That which was used in *sterealeography* may be also employed ; it consists of spirits of turpentine 7 parts, mastic of the finest quality 1 part, venice turpentine 3 parts, powdered white glass 10 parts. Wax may also be employed, or oil—in particular oil of *ben*—and other substances having the power of giving a durable transparency to paper.

Critical Notices.

THE SILVER SUNBEAM. A Practical and Theoretical Text Book of Sun Drawing and Sun Printing. Third Edition. By J. Towler, M.D. New York: J. H. Ladd ; and London : Trübner and Co.

We are glad to welcome a third edition of Dr. Towler's very complete and excellent Photographic Text Book. Keeping pace with the progress of photography, the third edition contains an appendix comprising the most recently discovered processes, and the most recent modifications of known processes. We have pleasure in recommending the work. Here is an extract on card printing, which may be suggestive :

PRINTING OF CARD PICTURES.

There is nothing peculiar in the printing of card pictures photographically speaking, as distinct from that in other pictures on paper, except it be the number of pictures on the same plate, for, as was to be inferred from the manner prescribed to take the negative, this plate may contain as many as sixteen distinct pictures, it seldom, however, contains as many. Condensing reflectors find their application here to great advantage when the light is dull. Such an arrangement of reflectors might be constructed on a moveable platform, or turn-table, capable of rotating horizontally, whilst the frustrum itself, lined by the reflectors, and supported on vertical pillars, has a vertical motion. By the two motions combined the frustrum can be easily brought in front of the direct rays of the sun, whereby a great condensation of light can be effected on any given surface. It is immaterial how large a surface may be occupied by the negative, or the sum of the negatives on the same plate, reflectors can be made in accordance, possessing the advantage of the direct rays that strike the plate, as in ordinary printing, together with the extra advantage of the condensed light from the rays after one reflection as well as from those after two reflections. The size of each of the reflectors alluded to will be proportionate to that given in a preceding chapter. If the negative plate be sixteen inches square, then it will be four times as large in its linear dimensions, as in the example given ; consequently, multiplying fourteen 78-100ths, and twelve 56-100ths by this ratio, that is, four, we obtain fifty-nine 12-100th and eighty-five 24-100th inches for the length of the upper or larger base, and eighty-six 24-100th inches for the length of the side of each plate of glass in the frustrum. Such a machine, of course, will be expensive ; but, like a windmill where no water exists, it will soon pay for its construction by economizing time. By such a condensation of the sun's rays, a negative will print well in from *thirty* to *sixty seconds*.

THE LITTLE TYRO. A practical Compendium of English Shorthand. By Dr. Gustave Michaelis. London: Trübner & Co.

Those of our readers interested in modes of shorthand writing will find this a very complete and philosophical system.

PRIZE PICTURES OF THE AMATEUR PHOTOGRAPHIC ASSOCIATION, 1864. London: Arthur J. Melhuish.

The prize pictures of the Amateur Association this year, are exceedingly satisfactory, and include examples which are both excellent as photographs and as pictures. "Caryatides, Athens," by Captain Hutton is an exceedingly fine picture, with but one fault: the background has been painted out. Captain Mason's "Mohamedan Tombs at Hookeree," is an exceedingly perfect picture, free from this fault; the whole is clean, delicate, soft, and very beautiful. "A Drawing room," at Newtown Anner, by Dr. Hemphill, a picture 9 inches by 7½, is one of those fine examples of the capabilities of the No. 1 triple lens, with which Mr. Hughes made us familiar in his interiors of Osborne. Objects scattered over every plane in a spacious apartment, are rendered with sufficient definition, and the whole picture is bright and harmonious. A pair of pictures by Mr. G. Bevington, entitled "A Storm" and "A Calm," are fine examples of maritime photography, with foreground, vessels, sea and clouds, all well composed. The white margin between the india tint and the pictures mars the effect seriously. "Ferns and Ivy," by Mr. J. W. Rimington, is a finely selected and photographed study of foliage. "Lac de Gaube," by Mr. F. H. Lloyd, is a fine picture, but would have been better without a white sky. In one instance, the Association have adopted the principle of giving a prize, not for one first-class picture, but for a series of general excellence. This prize has been awarded to Mr. G. R. Hall, for fifteen views of Oxford, the examples of which before us are excellent in all particulars, with the exception of having a white sky. The stereoscopic pictures of Captain Halford, an interior of a "Drawing room at Dytchley," and an instantaneous sea view with rocks and pier at Ventnor, are in every way, perfect and charming.

MR. THOMAS'S PATENT BOX TENT.

Mr. Thomas has just patented one of the most perfect portable manipulating chambers for practising photography in the field which we have yet seen. Starting with the idea that for the successful practice of field photography on plates at all beyond the smallest sizes, two persons would be required to carry all the apparatus to the ground, he has abandoned at the outset the trammels involved in the endeavour to make the tent itself pack into an unnecessarily small space. Recognizing this necessity for two persons to carry the apparatus, Mr. Thomas has resolved to take full advantage of it, and gain facilities for realizing a new idea in connection with portable laboratories, namely, that of packing everything *in situ*, ready for use at a moment's notice, without any arrangement or putting together of parts in the field.

The box tent consists, when packed up, of an oblong box 30 or 36 inches long, by 18 or 20 deep and wide. The frame-work is of yellow pine varnished, and the panels of millboard, a material which combines lightness, rigidity and durability in a high degree. This is covered with a waterproof material. At each end of the box is a strong loop or ear of leather, through these a stout pole is placed, which projecting about twenty inches at each end, can rest on the shoulders of two bearers, and be carried with greatest ease and steadiness. Arrived at the ground, it is at once fastened on to the stand and unstrapped. The lid which divides in the middle, is then lifted up, and a large spacious chamber is disclosed, about 30 or 36 inches high and wide, and 20 inches from front to back; two struts which are attached inside the lid, are then brought forward into a position slanting upwards, and supporting the light-proof fabric high over the head of the operator. On examining the inside, the bath, developing tray, plate box, receptacle for bottles, cups, cloths &c., are all found fixed in their places, and ready for immediate use. There is space in the box also for the camera, which may be packed inside without disturbing anything else.

There are a number of minor conveniences which our space does not permit us to describe in detail. The cloth fastens round the operator in an ingenious manner, giving him plenty of space, and freedom from constraint in his movements. The tray possesses two glass bars projecting above the edge, on which to rest the plate when developing, rendering unnecessary the usual small tripod developing stand. The lighting and ventilating arrangements are good. When erected for use, it is one of the most spacious and convenient operating chambers we know. It is the most readily unpacked and got ready for use which we have seen. There are no loose pieces to risk leaving behind, and it is handsome, strong, and portable when packed.

ON OBTAINING PORTRAITS BY THE MAGNESIUM LIGHT.

BY M. MC. A. GAUDIN.

It is now perfectly established that the combustion of a magnesium wire presents a convenient and inexpensive means of replacing daylight, for photographic operations in places naturally dark, whenever we desire to take the *fac simile* of a detail, at a short distance. Even for portraits, it is not so much the intensity of the light that is defective, as the mode of employing it.

As winter time approaches, for great cities, and especially for London, this last question is imminent. During one month at Paris, and during four months at London, when there is but little wind, we find ourselves immersed in a fog formed of the smoke vomited forth by a million chimneys, which not only obscures the light of day, but destroys almost the whole of its actinic properties, leaving only the red rays actinic.

Some twenty years ago, I made a long sojourn in London for the express purpose of removing this inconvenience, and constructing apparatus for taking portraits at night. At that period, only the daguerreotype process was in vogue, and accelerating substances were unknown; still I succeeded in taking small portraits in the space of a few minutes, and it is because I remarked their strange character, only suitable to form an object of curiosity for professional painters, that I consider it my duty to warn professional photographers against this evil.

At first, I operated with the vivid light obtained by feeding a coal-gas flame with oxygen gas, a splendid flame which lightens with equal volume, two hundred and fifty times more than the coal-gas jet; it appeared to be perfectly white; yet, upon comparing it with the solar rays, the colour of the shadows proved that its dominant rays were yellow; so that I obtained only moderate success with it.

By substituting the Drummond light, which results from magnesia or lime, submitted to a jet of oxyhydrogen gas, the result was much more satisfactory, with a light certainly less intense, but which possessed much more photogenic effect, so much so, that my apparatus might be advantageously employed at the present day, when a pose of seconds is substituted for one of minutes. With the same object in view, I have since tried the electric light, and the combination of pyrotechnic preparations of chlorate of potassa. This latter method appears to me the best, as I have already said many times; but it may now be very advantageously replaced by the combustion of magnesium wire.

In 1854, the year of my operations by means of the pyrotechnic preparations, I took out a patent specifying the principal conditions of success. I place in the front rank the necessity of having a permanent general lighting, beside the lighting for taking the negative, intended to act upon the pupil and keeping it contracted to the degree of avoiding a grimace in the sitter at the moment of operating. For greater facility, I have made my experiments during the day. At the end of a dark room, the sombre light of which represented the permanent light I considered indispensable: by this manner of

proceeding, during the combination of the pyrotechnic composition, the sight was scarcely disturbed; and at the end of three or four seconds, I obtained complete portraits, carte de visite size, by directing (be it understood) the light by the aid of an elliptical reflector, a metre in diameter and two metres focus, with a complete surrounding of white hangings.

The great extent of the flame, which represented a surface of about two square decimetres, tended also to the same end: this is why, in lieu of seeking to obtain a fixed position of the luminous point, it is better to produce only a great ball of fire by the simultaneous combustion of distinct magnesium wires; for the very brief duration of the pose is the first element of success for portraits, as long poses have never given anything but a a contracted muck devoid of life.

From the little success thus far with magnesium, I have conceived a means of replacing it, which, if it realizes my expectations, will require only an expenditure of twopence for a portrait of mean dimensions.—*La Lumière.*

Recent Patents.

The following specifications have recently been published:—

IMPROVEMENTS IN MOUNTING PHOTOGRAPHIC AND OTHER PICTURES.

This specification was filed on the 4th of August, 1864, by Joseph Lee and James Thompson, as a communication from Michael Monat, of Niagara Falls:—

The object of this invention is so to mount or combine pictures that that softness of tone and agreeable depth so much desired, especially in portraits, shall be produced.

The essential feature of the invention consists in employing or using two pictures of the same subject to produce or make one picture. We mount or place one immediately over or in front of the other, so that the characteristics of both pictures are blended together, the front picture being in all cases of a semi-transparent character. It is not necessary that both of the pictures so mounted or placed should be finished exactly alike as regards light, shade, and colouring, indeed the contrary might produce desirable effects; nor that both of the pictures should be of the one class, for engravings and photographs, and other combinations or mountings can be advantageously made. The back picture may in some instances have only some of the outlines of the front picture, and such back picture, to produce artistic effect, might be variously shaded, coloured, or tinted.

Our improvements can conveniently be carried into effect in photographs or sun pictures, and for that reason we here purpose setting forth the means we at present employ in that art to produce pictures according to our invention. We take or obtain a photographic picture on any suitable translucent or other substance for the back picture, and colour it with the ordinary lights and shades as may be desirable. We then take a second picture on paper or other thin material, by surface contact or other means, for the front picture. This latter, when of paper, we treat, rub over, saturate, or prepare with any "transparent resinous varnish" or other transparent substance, and then place it over or in front of the back picture either in immediate contact therewith, or, which we prefer, a short distance therefrom. When the front picture is to be kept a short distance from the back one, we have found it convenient to attach the front picture to the back of a sheet of glass by a transparent varnish, and to place a separating piece between the front and back pictures, round the edges thereof, or we may place a thin sheet of glass between the pictures, but in any case where rigid materials like glass are employed, the edges should be well secured, preferably in such manner that air would be excluded. As the outlines of the upper or outer picture must exactly overlie or coincide with the under or inner picture, the distance between such pictures or the materials on which they are taken or impressed need not be great. We have found a distance of from one-twentieth to one-eighth of an inch to produce the best effect.

Having now described the nature of our said invention, and particularised the same so that photographic and other artists may be enabled to carry it into effect, we would have it understood that we do not confine ourselves to the use, employment, or combination of any particular class or description of pictures, nor to the material or materials on which such pictures may be taken or impressed. What we claim as our invention is mounting or combining two pictures or representations of the same subject to form one picture substantially in the manner herein described and for the purposes set forth.

APPARATUS FOR VIEWING PHOTOGRAPHIC AND OTHER PICTURES.

This invention received provisional protection only, and was specified in February by Charles John Rowsell. It is as follows:—

This apparatus, according to my invention, consists of what may be termed an easel for viewing pictures, prints, photographs, and other articles, which I do by the aid of a magnifying glass. This easel is adapted for standing on a table or other suitable stand, and cousists of boards or parts hinged together at one end, the lower one forming the base, while the other may be raised at one end and inclined at any angle, being held up by a strut foot, in the manner of a writing slope, which foot is enclosed between these parts when it is shut down on the upper and inclined board; towards the lower end I mount and hinge a rest, against which I place the pictures or objects to be viewed, this is fitted to the inclined board in a transverse bar, which can be slid lengthways of the apparatus, while at the higher end is mounted a hinged transverse bar, on which I place a magnifying glass. The object of hinging these pieces is to fold them down flat, and so occupy little space, and be readily portable, as they may be fixtures if desired; a suitable catch is provided to secure the magnifying glass holder in its raised position. In viewing single pictures I employ a large circular or other shaped magnifying glass, through which a person can look with both eyes; it is set in a suitable frame, which is fitted to the transverse bar before mentioned, so that it can be changed for another glass or glasses, for the purpose hereinafter explained. With this apparatus a person desiring to view the picture places it on its rest, raises or lowers the inclined board to suit his convenience, and in looking through the glass regulates the position of the picture to the focus best adapted to his sight by moving it toward or further from his magnifying glass. The same apparatus I adapt for viewing stereoscopic pictures, that is to say, looking at two copies of same picture at same time. For this purpose, to the inclined board I hinge a thin black partition piece, disposed at right angles to the plane of the pictures or glasses, as in stereoscopes; this partition is hinged, so as to be laid down flat when viewing single pictures, but is raised in a vertical position for stereoscopic pictures, and I substitute double eye glasses in lieu of the single one before mentioned, when the apparatus becomes in fact an open stereoscope. To view glass shades there is an opening through the picture rest in which is inserted a piece of ground glass, through which the transparent shades or stereoscopic pictures may be viewed. The picture rest may of course be slid towards or from the eye-glasses to get the focus, as before explained with reference to single pictures. The same apparatus is applicable for drawing or painting pictures, using it as an easel, and employing the magnifying glass to view the work as it progresses.

HOW TO INTENSIFY DRY NEGATIVES.*

In landscape photography particularly, as well as in room-work partially, a process by which negatives that have already become dry may be successfully intensified, is a desideratum for all practical photographers. The following is the method we practise ourselves:—

We always endeavour to make the exposures as nearly correct as possible, judging from the working properties of the lens, the nature of the light, and the scene to be reproduced. The first of these are invariable, and require only to be learned and noted down. For instance, a lens may produce a good negative, with a given aperture and a bright light, in one second; whilst another lens, other things remaining the same, will require two, three, even ten seconds. This special character of the lens must be known.

If the light be faint, feeble, or obscured by clouds, the

* From *Humphrey's Journal.*

photographer must learn to proportion the exposure in accordance. This requires practice and minute observation.

The artist will find, too, in his photographic peregrinations, that the exposure will vary to an immense degree with the same light and lens; the only difference being the scene to be reproduced; for one landscape may require only four seconds, whilst another, by simply turning the camera round, will not be satisfied with less than as many minutes. This variation is not at all uncommou in deep ravines and waterfalls.

The exposure having been hit upon with tolerable accuracy, the details of the picture will appear with facility on the application of the developer. (We are speaking all the time of the wet collodion process.)

Developer.

Protosulphate of iron	2 drachms
Water	4 ounces
Alcohol	3 drachms
Acetic acid	6 „
Loaf sugar	1 drachm.

Pulverize the irou salt and the sugar, then dissolve iu the liquids and filter.

Prepare the developer fresh every day, and sufficient for the day. Flow the plate quickly and uniformly with the developer, so as to avoid unequal development; be very particular, however, not to allow the developer to fall from a great height upon the film, otherwise the part upon which it so falls will be quite differently developed from the rest.

Now, watch the process, and move the developer backwards and forwards upon the film until all the details have appeared, and the lights do not yet begin to fog. At this stage the development may be stopped, or it may be continued, if the shades are not sufficiently intense, until the light parts begin to be slightly veiled. It is better to close the operation before arriving at this result; because, if the picture is already complete, although feeble, it may be strengthened to any extent afterwards; and the lights are thus preserved bright and pleasing.

Intensifying Operation.

At a convenient time the edges of all the negatives are covered with varnish to the amount of one-tenth of an inch all the way around, and then put away to dry. It is an advantage to leave them to dry at least three or four hours. They are then ready to be intensified.

Alcoholic Solution.

Alcohol	1 fluid ounce
Water...	1 „

Pour a sufficient quantity of this solution, so as to cover the whole film, then return it to the bottle, and immerse the plate gently, but quickly, in a dish of water, lest the alcohol might dissolve off the varnish. The intention of this solutiou is to cause the film to be more porous, and less liable to split up in the subsequent operations.

Tincture of Iodine.

Alcohol	1 fluid ounce
Iodine	12 grains.

Pour four drops of this solution into four drachms of water; shake the mixture, and then pour it upon the wet film, and keep moving it backwards and forwards, and pour off and on until the shades of the film assume a slight rose tinge by reflected light, or until the tincture has lost almost all its colour.

Now wash the film carefully, place it upon a levelling stand, or a wide-mouthed bottle, and prepare the following solutions:—

Pyrogallic Acid Solution (Stock Bottle).

Pyrogallic acid	12 grains
Acetic acid...	1 ounce.

Nitrate of Silver Solution (Stock Bottle).

Nitrate of Silver	20 grains
Water	1 ounce.

Of the former take 1 drachm, and add thereto 7 drachms of water. To 2 drachms of this solution add 4 drops of the nitrate of silver solution; shake the mixture, and pour it upon the film. This operation ought to be performed in a place where the light can pass up through the plate from beneath, as in a doorway, or over a small lamp, if in the night time, or in the dark-room. Pour the mixture on and off, aud keep it in motion over the film. The shades now will become gradually more and more dense, until, finally, the negative is sufficiently intense for printing. With an under-exposed negative this stage sometimes cannot be attained with one operation. In this case, wash the plate and flow it again with iodine and pyrogallic acid.

In all these operations of flowing and washing the plate, it is necessary to allow the fluid to fall gently on the film, and not in violent jets, or in large quantities, otherwise the film may easily give way and peel off. This accident is liable to take place in those parts that manifest iridescent patches, that is, where the film is very thin. With care such a misfortune can be at all times avoided.

As soon as the proper intensity has been attained, the plate is again washed, and flowed, finally, with a drachm or two of the following toning solutiou:—

Chloride of gold	1 grain
Water	4 ounces.

By this final process the picture assumes an agreeable rich tone of blue black. Allow the solutiou to remain only just long enough to produce the tone in question; for it has at the same time a slight bleaching effect. The negative is thus toned, and the lights clarified. Should the bleaching have proceeded too far, wash and intensify again with pyrogallic acid aud silver; but no more toning will be required.

Wash the plate finally, and set it aside to dry, or dry it by artificial heat, and then cover the film with a coat of varnish.

When all the fluids are in working condition and position, it takes less time to perform the operation of intensifying than to describe the process, which is reliable to the highest degree, and, consequently, worthy of being practised.

DIE OR STAMP FOR CUTTING OUT CARD PICTURES.

BY PROF. TOWLER.

MANY of our subscribers may not know that there is such a thiug as a stamp by which the card picture can be stamped out from the paper by a single blow of the mallet. We, therefore, attempt to describe its construction and use for their benefit.

Take a blade of steel, about one inch or one inch and a half in width, three sixteenths of an inch in thickness on one side, and running off into a knife edge on the other; bend this blade into a circle, and weld carefully together the two ends. The next step is to form it into a rectangle, or into the shape and size of the eard picture. An ingenious blacksmith or mechanic can do this; but an experieneed cutler or surgieal instrument maker will be best enabled to do it right. Great care is required in getting the angles perfeetly sharp. The rectangle is now filed so that the cutting edge is perfectly horizontal, uniformly sharp, and geometrically correct in form. The stronger and firmer the rectangle is, the better. An iron handle like an inverted $\wedge$ is next *firmly* rivited to the back edges of the sides of the rectangle; and the $\vee$ part of the haudle is made exceedingly strong, in order to prevent the sides of the rec-

* From *Humphrey's Journal.*

tangle from giving way, under the repeated blows of the mallet. The inside of the rectangular blade is perpendicular to the surface of the paper it is intended to cut out.

As soon as the stamp is so far completed, it is tempered to a plum colour, bordering on the cherry; or, in untechnical language, it receives the temper of cutting instruments, and is then sharpened on a grindstone and afterwards on a hone.

A block of wood is next prepared by cutting several square edged pieces of maple longitudinally, planing them smoothly, and then gluing them compactly together. When thoroughly dry the two ends are sawed off at right angles to the lateral surfaces, and finally planed. A single block of maple, if it can be obtained large enough, will save the trouble of attaching several pieces together by glue.

The instrument is used in the following manner:—

Place the print, before toning and fixing, on the wooden block, and then, adjusting the rectangular stamp upon the paper, the card picture is cut out by a single blow of the mallet, and then stored away in a dark box until the toning operation can be commenced with.

Unless the stamp be well and strongly made, the sides are apt to give way; and on this account, this very useful and exceedingly satisfactory instrument has been cast aside by some of our first houses. Other houses, on the contrary, who have been fortunate enough to secure scientific as well as practical workmen to prepare the rectangular stamps, have used them for months without any apparent change of shape or deterioration.

By means of this instrument card pictures can be cut out with great velocity and all of the same uniform size, and thus time is economized. Much gold is also saved by cutting the card pictures out before they are toned. Upon the whole, the rectangular stamp is an instrument which we have no hesitation to recommend as a very useful appendage to the paraphernalia of a photographer's laboratorium.

THE ART CLAIMS OF PHOTOGRAPHY.*

It is not, however, to representations of the ideal, that the adverse judgments to which photography is exposed are pointed. Photographers do not claim to represent it, and if they did, comparatively few artists of our generation would be in a condition to throw the first stone at them for the offence of making the attempt without success. Portraiture is the form in which photography is most familiar to the world; and it is to portraits that most criticisms apply. So far as these criticisms are addressed to the art itself, and do not turn upon the demerits of the artist, they really are, under one guise or another, nothing but the objection that the sun is not flattering enough for the feelings of sitters or their friends. But it must be admitted that a large proportion of the complaints that are made are directed against the shortcomings of photographers, and are often richly deserved. Photography is only mechanically accurate in the form of outline that it gives; it is not necessarily accurate in the distribution of light and shade. And even its mechanical exactness cannot be depended upon if the simple manipulations of the camera are not properly performed. The worst class of photographers, popularly known as "touters," partly owing to ignorance, and still more to inferior apparatus, do not always perform *even this part* of the operation with success. Their figures, or parts of them, are not unfrequently either blurred or distorted by the faultiness or the mismanagement of their lens—results similar to those which, as we have seen, are produced by the perverse photographers who put their lenses out of focus purposely in pursuit of the ideal. One of the commonest sources of this kind of distortion is a neglect to adapt the depth of focus of the lens and the pose of the sitter to each other. The photographic lens at ordinary distances is only in focus—that is to say, only gives a true picture—for objects that are at a particular distance from its surface; but the word distance is to be taken roughly, and includes a certain depth of distance, varying according to the structure of the lens. Some lenses are accordingly said to have a deeper focus than others—that is to say, there is a larger depth of distance within which objects are in focus to them. A lens may be, and portrait lenses usually are, of so shallow a focus, that if the eyes are in focus the nose will be slightly blurred, and any parts of the body which are nearer still to the lens will be perceptibly enlarged. This defect can be remedied by reducing the aperture of the lens, or, as it is technically termed, "stopping it down," by which the depth of focus is increased. But as this reduction of aperture necessarily reduces the amount of light that can enter through the lens, it makes a longer exposure necessary: and long exposures are very inconvenient. Either the sitter moves, which entirely destroys the picture, or he assumes an aspect of unutterable gloom, which makes the picture very unpleasing. A nose of too ample proportions will occasionally, even in the works of good artists, leave an ungraceful record of the operator's reluctance to stop his lens down sufficiently for fear of wearying his sitter. Far more formidable illustrations of the evil consequences of being out of focus occur when sufficient care has not been taken to pose the sitter so that all parts of his body are, as far as possible, at an equal distance from the surface of the lens. In those which fall short of the focus, the exaggeration is violent enough to strike even the most unpractised eye. But this defect, which is the result of sheer negligence, is now rare even in the lowest walks of the art.

There is another form of distortion, scarcely found except in the works of the cheap photographers, which produces a still more painful caricature. Every lens is constructed to throw one image, or "cover a plate," of a certain size; and up to that size, if the lens be a good one, and it is properly stopped, it will throw it with accuracy. But if a plate of a larger size be put behind it, the part of the plate which is outside the calculated size will probably be covered by an image of some kind; but it will be an image that will have more resemblance to the picture that may be seen on the inside of a spoon than to any object in the natural world. Photographers of the economical class are rather in the habit of using lenses for taking cartes de visite which are not made to cover easily quite the whole of the plate they employ. The result is, that the feet of the standing figure are apt to be involved in the margin of hazy distortion that marks the limit at which the clearness of the lens begins to fail. It may be thought that the difference in cost between lenses of nearly equal size can hardly bear a sufficiently large proportion to the sum-total of his expenses to make it worth the cheap photographer's while to injure his reputation for the sake of it. But there is a much stronger temptation. As the lens increases in size a large space is needed between it and the sitter; and, therefore, a longer glass-room or studio is implied by using a lens which covers a larger sized glass-plate. It is not always in the photographer's power to make a longer glass-room at the top of the house he occupies; and, therefore, the employment of a more suitable lens may really mean the taking of a more expensive house.

These disfigurements, incidental to cheap photography, would hardly be worth dwelling on if they had not been made a reproach to the whole art by hostile critics. The error which more commonly mars the beauty of a photograph—the faulty distribution of light and shade—is not necessarily confined to any class of artists. Success in this point is, in fact, the touchstone of photographic excellence; and it is a point upon which the artist's own taste is sometimes inevitably overborne by the counsels of commercial prudence. The portrait photographer has three implements with which he can manipulate his light and shade. He has his glass-house, with its apparatus of blinds, by which he can at will make the light fall upon his sitter's face, from this side or from that, from above or from the front. He can regulate the exposure, which, if short, will make his picture hard, with strong contrasts, and, if lengthened, will make it soft, with little contrast. And, finally, he has his developers and intensifiers, which will increase the opacity of the high lights upon his negative, and consequently the general contrast of the picture, to any extent he pleases. It is by the skilful or unskilful use of these implements that a photograph can be made either a beautiful likeness or a very disagreeable caricature. If you take a dark-browed man, with eyes deeply sunk and a prominent cheek-bone, and photograph him under a vertical light, you will produce upon paper the figure of a scowling and hungry murderer. The heavy shadows under the eyes lend a savage ferocity to the countenance; and the almost equally heavy shadow under the cheek-bone suggests the lantern jaws of extreme emaciation. On the other hand, if you take a young lady with her eyes *à fleur de visage*, and photograph her with a low front light, you will quite as effectually produce a face from

* Continued from p. 538.

which all traces of expression and of intellect are banished. These are extreme cases; but every cast of countenance has its peculiar beauty or defect, which the photographer, by judicious lighting, can either heighten or diminish. The exposure in the camera is not much relied upon for the purpose of adjusting the light and shadow. Sufficient exposure is generally given to bring out every detail; and it is left to the intensifier to add whatever necessary contrast the lighting may have failed to secure. If the best artists were left to themselves, they would probably use the intensifier very sparingly. But the public is very imperious upon this point. It does not care much for flesh tints; but it will have a white face. And if, in that obliteration of half tones, which is the result of liberal intensifying, a wrinkle or two should disappear, the public does not very much object. To those who bear in mind that the human face is rarely of one shade, and that it still seldomer emulates shirt-fronts or collars in whiteness, the lavishness with which many even of the leading photographers whiten the faces of their sitters appears almost offensive. But they have no choice. Neither men nor women like to be credited with darker skins than need be. And there is some excuse for them, in this case, in the defects of the art itself. Photography behaves very well to youth. The white skins and purple bloom of youth fare well enough upon the sensitive plate. But when disordered livers and hot rooms have communicated a tint of yellow to the brow, and have transmuted the bloom of youth into a patch of brickdust, the silver salts are ungallant enough not only to record but to exaggerate the fact. Yellow and red are the "non-actinic" colours, and therefore are represented by a dark shade upon the finished picture. But violet is the most actinic colour of all; and therefore the darkness of the crimson class of reds is a good deal modified. It must be acknowledged that the distinction between visual and actinic colours, however convenient in manipulation, is an important defect in photographic art, and in portraiture especially creates numerous difficulties. Light yellow hair, of the kind that has no gloss on it, comes out black in the picture, and the victim is unrecognizable by his dearest friends. One or two well-known photographers are in the habit of dabbing refractory red or yellow hair with white powder. The device, however, is not entirely successful. The process is quite delicate enough to record the peculiar texture of hair powder, and the unfortunate red-haired sitter is paraded before his family under the guise of a footman in his master's clothes. The photographers in question even carry the idea so far as to powder the cheeks of their lady sitters, in order to obliterate unmanageable reds or yellows. Strange to say, many of the fair victims are not pleased with this unceremonious manipulation. Assuredly, it is better to obtain the required degree of whiteness, if so it must be, by plying the intensifier, than to resort to meretricious devices of this kind.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 9th November, 1864.

M. CASSAN, photographic chemist of Montauban, has addressed a communication to *Le Moniteur de la Photographie*, on the subject of his patent process for coloured negatives, by means of which he obtains (without strengthening the negatives) very vigorous positive proofs, full of detail *in the lights and shades*, and which, by the harmony and delicacy of the design, possess the advantage of not representing the model old and ugly, as may generally be charged against portraits taken from ordinary negatives. This process is also economical, as it dispenses with the products employed in ordinary strengthening, and which, even when the operations are small, cost upwards of 100 francs a year. In speaking of these advantages, I shall observe that the exposure in the camera must be diminished one fifth of the time required for intensified negatives, and that the risk of spoiling the collodion film by washing under a copious stream of water is never incurred.

Notwithstanding the admirable results obtained every day by skilful operators, sitters are seldom satisfied with their photographic portraits.

Observation evidently proves deficiency in harmony, and crudeness of design are inherent to the ordinary strengthening of negatives, which, instead of exercising its action simultaneously upon the whole negative picture, has more affinity for some parts than for others. From this inequality results the effects that the darks of the negative (where the maximum of strengthening is produced) will possess too much vigour and lose their half-tones, some time before the face has acquired the precise opacity, and consequently, there results exaggeration of contrast, loss of modelling, and rendering the person represented ill looking.

For a long time, struck with the delicacy of drawing and quality of detail which exist in a negative *simply developed*, I often asked myself if it were not possible to obtain positive proofs with that delicacy of detail we so much admire in *non-strengthened* negatives.

I have sought the means, and I believe that I have attained my object by the following process.

I take a negative developed with sulphate of iron, or with pyrogallic acid, and after fixing and washing it, I *convert* the grey precipitate, which forms the negative picture, into a *green*, *yellow*, or *red precipitate*, colours which by their antiphotogenic property, allow but little chemical light to pass, and yield very vigorous positives, in which the softness, half tone, and detail which exist is non-strengthened negatives are found.

One minute, and less than one centime's worth of reagents, suffice for the toning of a negative.

This communication was accompanied by a specimen of a negative coloured yellow, upon which the editor of *Le Moniteur* remarks, that it has a very harmonious appearance; the blacks are replaced by a yellow, more or less intense, according to the gradation of tones in the picture.

M. Renault has presented the following note to the *Academie des Sciences*, on the protochloride of copper:—A copper plate immersed in bichloride of copper, perchloride of iron, diluted *aqua regia*, a mixture of bichromate of potassa and hydrochloric acid, of chlorate of potassa and diluted hydrochloric acid, in a word, in any liquid which abandons chlorine more or less readily, becomes covered with a light grey coating, which whitens upon contact with ferrocyanide of potassium, and then becomes brown red. Air and water give it a yellow colour; then the liquid gradually becomes blue. Hydrate of potassa in solution also colours it yellow, as do the alkaline carbonates. Carbonate of ammonia behaves like ammonia, which dissolves it, and colours it blue. This coating is soluble in hyposulphite of soda, cyanide of potassium, a solution of iodine in iodide of potassium, hydrochloric acid, more or less diluted, sulphate of ammonia, &c. Dilute nitric and sulphuric acids do not sensibly act upon it, at least, when their presence is not too prolonged. The most remarkable property of the cupreous chloride thus obtained is the facility with which it changes in solar light; its light grey colour grows darker and darker, becomes black, and acquires a cupreous metallic lustre like that presented by the fracture of a piece of indigo or prussian blue. This property appeared to me capable of being turned to account in obtaining daguerrean pictures, and the result has confirmed my anticipations. A negative placed upon a plate of copper sensitized by means of bichloride of copper gave me a positive picture of remarkable delicacy, and free from metallic reflection. When the film of chloride formed is sufficiently thin, the rose colour of the copper in the lights, viewed as a transparency, presents a ground of a more agreeable hue than the old daguerreotype plates.

The solvents of the chloride changed by the action of light are, at least those above mentioned, the same as those of the unchanged chloride.

The proto-chloride dried rapidly, sheltered from air and light, retains its original grey colour; exposed in its dry state to the solar light, it with difficulty assumes a light yellow tint. The proto-chloride employed in these experiments was precipitated from its hydrochloric solution.

If some dry, white, crystalline proto-chloride be spread

upon paper and exposed to the sun, and the same thing be done with proto-chloride melted in a platinum crucible, and then pulverised, no change takes place so long as the state of dryness is maintained; but if a few drops of water are allowed to fall upon it, every portion of moistened proto-chloride assumes successively the yellow, grey, black, and violet hues above mentioned. If the state of humidity be maintained, a blue colour results, due to the formation of bichloride.

A plate of copper sensitized and exposed to light, and then quickly washed, gives no sensible colouration with ferro-cyanide of potassium in the washing water.

PURITY OF CHLORIDE OF GOLD.

Sir,—In the discussion upon chloride of gold recently adverted to in your columns, it occurs to me that a point has been overlooked, and which none of your correspondents have noticed. All the manufacturers who advertise in the Photographic News guarantee 50 per cent. of pure gold in their articles, but that is not the terchloride of the laboratory, which, according to Brande, stands thus: gold, 200; chlorine 108, = (gold 65, Cl. 35) 100. Gregory, in his "Inorganic Chemistry," gives gold 197, chloride 35·5, and Au Cl. 3 = 305·5, and says, "It forms, when evaporated sufficiently, ruby red crystals." thus showing a difference of 20 per cent. in the proportion of pure gold of which it ought to consist.

Now, is it not probable that by the care and attention bestowed by Mr. Eliot in his preparation, he eliminates more of that which contaminates the commercial article, and arrives much nearer to the pure terchloride; the colour is also a test to show it is pure, which of course accounts for the superiority he finds in that made by him. I find also that M. Ommeganck, in an article on "Auro-Cuprie Toning" at p. 472, vol. vii. of the News gives, as the proportion, 6 out of 10 for pure gold in his formula, which is very near the true proportions. It is therefore evident that if photographers desire to have pure terchloride of gold, they must avail themselves of Mr. Eliot's kind and valuable communication. I have not alluded to this question financially, as you seem to think that ought to be left out of consideration where the interests of the art are concerned.—I remain, sir, your obedient servant, J. P. W.

[Pure terchloride of gold is of the red colour to which our correspondent refers. But in this form it is very difficult to prepare or keep, being very deliquescent, and easily decomposed. Chloride of gold in the orange crystals usually sold is really a double chloride of gold and hydrogen, which is a comparatively stable salt. By cautiously heating this hydrochloric acid is expelled, and the pure neutral terchloride left. The commercial fair samples of chloride of gold in the market which are neutral are generally double chlorides of gold and sodium; those which do not contain sodium are generally the double chloride of gold and hydrogen, and contain hydrochloric acid. To prepare an article which will keep, and be presentable commercially, it is almost imperative that one of these methods should be adopted, and in guaranteeing 50 per cent. of pure gold manufacturers are allowing for the presence of the acid or other base. We have no doubt whatever of the purity and efficiency of the method described in Mr. Eliot's excellent article.—Ed.]

PHOTOGRAPHIC BEER.

Dear Sir,—I have a few words to say on beer, it shall not be a rapturous eulogy upon the foaming tankard, or the "jollity" of a "glass of bittaw beaw;" but on the preservative qualities of beer taken photographically.

A writer in the *British Journal*, and, I believe, one of the editors thereof, has very much surprised me by thus writing of "the predeliction for the beer classes of preservatives." "However valuable," says he, "they may be in respect to simplicity and uniformity of action in the preservation of dry plates, they have, nevertheless, the disadvantages of being less easily impressed by the actinic rays, not to speak of the danger incurred of great waste of solution withdrawn from its legitimate purpose."

For my own part, I feel much indebted to our Edinburgh brethren for this suggestion of a new and temperate use of the common beverage. I am convinced *it is* "valuable in respect to simplicity and uniformity," besides the recommendation of its being always at hand, ready for use, at all times, and in all places. Any sort of beer, as far as my experience extended, answering the purpose, though the bitter beers are perhaps the best suited.

Without having made any accurate comparative experiments, I may state my impression that it yields plates more sensitive than malt and tannin, or simple tannin, gives more even skies, and a rich brown colour of negative, without much silver being required in developing, such as give strong and soft prints, particularly suited to stereographs.

With long focus lenses, or a weak light, it has, in my practice, one defect, that of being sluggish in developing; such negatives seem to want the stimulus of more tannin than there is within beer, or possibly a different character of collodion may remedy it.

But what is this alarm raised about "the danger of great waste of solution withdrawn from its legitimate purpose?"

If I choose to save half my allowance of beer in order to prepare three or four dozen plates, or supposing I can afford an extra half pint for that purpose, am I, in any sense, wasting it? A man entering a protest of this kind, should, to say the least, be consistent, and practise what he preaches.

Supposing the legitimate purpose of beer to be that of supplying an exciting beverage, then the legitimate use of tannin is that of converting hides into leather, yet this writer warmly advocates the application of tannin to the same "illegitimate" purpose to which some of us have applied the compound decoction. Again, has he given up the use of albumen in various photographic processes? If not, may I remind him of the "legitimate" use of eggs before their extensive abuse in photography, he may be sure that the hens never laid eggs for him to spread the whites upon paper, any more than Messrs. A and B brewed pale ale *for the purpose* of spreading on flat glasses.

I may say, without being charged as an advocate of teetotalism, that beer owes a debt of gratitude to his new supporters, for giving him a share in the promotion of so beautiful and elevating an art as photography. There are some who will agree with me when I say that one good negative, procured by the assistance of half an ounce of beer, raises my spirits, and invigorates me more than half a pint of the same, absorbed in the "legitimate" way, and so, I am bound to confess, beer has made a grateful return to his new friends.

The conclusions given above are drawn from negatives developed with carbonate of soda, a discovery for which I, amongst others, feel thankful to the author, as by shortening the necessary exposure, it enables us with dry plates to take subjects hitherto beyond the capabilities of any but the wet process. At first, I found sometimes a slight veil of fog in the shadows, due, as I believe, to imperfect washing out of the alkali before strengthening.

To remedy it, I adopted the plan of pouring over the plate before strengthening with nitrate of silver, a very weak solution of acetic acid, mere acidified water, which keeps the film clean and clear. One important desideratum in the dry processes still remains to be established, that of being able to keep them a reasonable time after exposure, without loss of sensitiveness. I have not yet had time to test the beer preservative in that respect. What say our Scotch friends, who have more experience of it?

I enclose two prints from beer negatives, and remain yours truly, G. S. Penny.

Cheltenham, Nov. 4, 1864.

[The prints enclosed by Mr. Penny are most charming pictures, and equal to the best we have seen by any process. If photographers generally can get such pictures with beer, there will be a run upon the breweries.—Ed.]

Talk in the Studio.

Dinner to Photographic Employees.—On Tuesday week we are informed Messrs Downey, Brothers, gave a dinner to the various assistants employed in their photographic establishment; the occassion being the inauguration of a new or enlarged studio. Mr. Ingham, M.P. for South Shields. presided, and the Incumbent of Gedney church and some other gentlemen joined the company at dinner. We are glad to record instances of the pleasent relatious between employers and employed in our art, which theso social and festive occasions indicate.

Robbery of Photographic Apparatus.—An operator. named William John Richmond, was a few days ago before the bench at Lincoln, charged with stealing photographic apparatus, worth £70 or £80, from his employer, Mr. W. N. Tollerton. He had obtained the key of the studio early in the morning, taken off a box containing the apparatus, &c., in question, and gone to Hull, where he was speedily traced by the police, and taken with the stolen property in his possession. These facts being proved, he was committed for trial.

Photography at the Mansion House.—At a recent conversazione given by the Lord Mayor, photography took a prominent position. In addition to other specimens a very complete series of photographs, the property of Mr. Tite, M.P., was exhibited, which included every English Sovereign from Henry VI. to her present Majesty, and also a collection of illuminated missals of rare beauty. A volume of autographic letters and illustrations of Oliver Cromwell, contributed by John Dillon, Esq., is perhaps the most complete personal record of the life doings of the great Englishman possesed by any private collector. The new art of photo-sculpture was illustrated by a collection oi statuettes of rare merit, both in an artistic point of view, and on account of their fidelity to nature. Many of them were of puplic men, so that every one was able to form an opinion of the development that an art, as yet in its infancy, is likely to receive. Photography was further represented by the London Stereoscopic Company, whose valuable collection of everything choice and curious in the art, including a photographic copy of the leading journal of the period for Lamas Day, 1793, giving an account of the capture of Valenciennes by the Duke of York. The size of the sheet, the meagreness of the account, of so important an event, and the slovenly typography, when compared with the ample area of modern newspapers, the accuracy and detail which characterise ' our own correspondent's" letters, and the admirable make-up, had an aspect rather comic than curious.

To Correspondents.

Edward W. P.—There is no work that we know of devoted exclusively to the production of photographic transparencies or to their colouring; but a large number of articles on the subject both of production and of colouring, have appeared in our pages from time to time.

Medallion.—In protection by registration, it is the shape, design, or configuration which is registered and secured as the property of the inventor. In the cameo portraits, we apprehend, that the convexity given to the disc is really the salient point, rather than the arrangement of the four figures on the card. It would be quite legitimate we fancy, of anyone to arrange four portraits after the same fashion, if no convexity were given to them, but we apprehend that neither four, nor one may be made convex without permission of the inventor.

A Careful Student but a Slow Coach.—So far as we can understand, your difficulty arises rather from the want of an unobstrueted expanse of light outside your room, than from having too little glass in it. With the amount of glass you describe, you ought to work sufficiently rapid, but if the light he interrupted by walls or buildings, it is a difficult thing to mend matters. A white moveable reflecting sereen, which may he placed in any position in relation to the sitter may he useful. Of course you will under the circumstanees use the blinds as little as possible, and avail yourself of all the light you can get upon the sitter. A bath with as little acid as possible, a sensitive collodion—try several samples to find out which suits your room best—and a strong iron developer, are the only aids which we can suggest, unless it is possible to alter your studio.

Ruffel.—We do not know the address of the gentleman in question; hut Mr. Solomon, of Red Lion Square, is the agent.

Stanley.—It is possible to produce transparent positives direct in the camera by M Sabatier's process. This consists in developing the image partially, then washing it, covering with a solution of nitrate of silver, exposing to light, and again developing with pyrogallic acid without acetic acid. This produces the reverse action of light, the silver being deposited on the shadows. You will find some articles on the subject in our sixth volume. But we prefer the method described in the article to which you refer in our last Year Book, of producing the transparency from a negative. We hope shortly to have an article giving some valuable hints on producing enlarged negatives by this method.

J. F. M.—The stains to which you refer are due to an irregularity in the albumenized surface. Possibly your albumen has not been sufficiently well beaten. One and a half minute's floating on the albumen is longer than necessary. We have not answered such questions by letter.

A Constant Reader.—We are obliged to you for the information, and will give further attention to the subject.

H. W. Taunt.—Thanks for the views, which are very excellent.

Bristol.—The charge of £10 will doubtless operate very unequally. For photographers doing a large business it is not a large sum, but for those whose business is small the sum is doubtless heavy. If our influence could have altered the matter, it would have been altered in favour of the poorer class of photographers. But you surely err in saying that photographers will not obtain any better price for their pictures. They may, if they choose. It rests entirely with photographers to say whether they will charge the same for prints by the patent proeess, as hy the ordinary printing.

Aspen.—So far as we understand the case you describe, the rating appears very arhitrary; hut the question is a purely legal one, which we are unable to answer. Should we be able to obtain any information on the subject, we will refer to the matter again, and let you know.

W. H. S.—If you followed the instructions carefully,] you would have succeeded. Where you have failed, it is difficult to say, as you are not specific in your description of your operations. After precipitating all the silver as a carbonate, you must wash the precipitate thoroughly to remove all excess of carbonate of soda and nitrate of soda. This washing is to be repeated several times. If then you add nitric acid to the washed precipitate, it will dissolve, and you must not add any water until the precipitate is nearly all dissolved by the nitric acid. It is probable that you have neglected to wash the precipitate thoroughly, and your nitric acid has been neutralized by the carbonate of soda not removed by washing; possibly, also, yon have been in too great a hurry, and have not allowed the nitric acid time to dissolve the carbonate of silver. If yot still have your silver in the form of a carbonate, wash it thoroughly, and add nitric acid until it is dissolved. It is impossible to state the proportions of each material to he used, because you are working with a solution with an uncertain quantity of silver to begin with. In all such operations, it is important t at the operator should use judgment and observation, and follow out carefully and intelligently the instructions. No directions can be given in such matters, which will render a general knowledge of manipulations of the kind unnecesssry. Should you still fail to get out of your difficulty, write again, stating carefully and clearly, each step you have taken, the materials used, and the quantities.

T. G.—The use of a bath of iron solution in which the negative is immersed, for the purpose of development, whilst necessary in connection with some apparatus, is somewhat inimical to rapid working, inasmuch as the energy of the developing solution is slightly reduced by the immersion of each plate, and the free nitrate upon the plate, instead of being mixed with about an ounce of developer, as in the case when the latter is poured on, is mixed with a much larger portion. The only suggestion we can make in order to keep up the developing energy, is to use a solution of iron as strong as you find by experiment can safely be employed, and to renew it frequently.

J. Belcher.—We do not remember the address, but will enquire.

G. S. Penny.—We are obliged by your communieations. That on "hlurring," shall receive attention in our next, when we shall probably have something to say on the subject.

Proto Iaon —From your description the repulsion of the bath solution, from the surfaee of the film is due to the character of the collodion. If moving about in the bath thoroughly several times during the immersion, do not remove the tendency, add to each ounce of collodion, one drop of distilled water, and shake well. This will generally remove the difficulty.

E. H. B.—The time which may be permitted to elapse between exciting a plate and developing it depends much upon circumstances. The condition of the hath, the quality of the collodion, and the temperature all influence the result. As a rule, the longer the plate is kept, the greater the danger of stains, &c. Under good conditions, a plate may be kept an hour and yield good results, but it is better not kept more than five or ten minutes. Should the plate have partially dried before developing, it is hetter to Immerse it in a dilute bath of nitrate of silver, about 10 grains to the ounce, very slightly acid, before applying the developer. 2. Finishing prints with boiling water after washing is a safe precaution, but not absolutely necessary.

I. J. R., Yarmouth.—Acetate of lead is used in conjunction with gallic acid as a developing agent, and possesses great energy Used in developing pictures, there is, however, a little liability to stains. About 6 or 8 drops of a 30-grain solution of acetate of lead are added to an ounce of a saturated solution of gallic acid. For collodion negatives this is an energetic developer, and also for paper; but with the latter it requires very careful manipulation.

Henry Pippett.—In dealing with a good optician you have generally an absolute guarantee of obtaining a good instrument, which is in other cases wanting. The English makers will generally examine and verify lenses of their manufaeture, which are in the hands of second-hand dealers; and it is, therefore, worth the trouble of calling upon them to get such verification, in order to obtain satisfaction. We prefer those of No. 2 in your list.

T. H. Redin.—The only supposition which will explain the double image in your negative is an accidental movement of the camera, which may have slipped in some way during the exposure. The result is very curious.

Several correspondents in our next.

Photographs Registered during the Past Week.

Mr. J. Pender, 6, Georgs's Street, Waterford.
Photograph of Terriers.

Mr. Joseph Rowland, Blackpool, Lancashire.
Photographic Group—Joseph Rowland's Six Sons.

Messrs. Crabb Brothers, 67, W. Nile Street, Glasgow.
Photograph of Rev. M. Slater.

Messrs. Jenkins & Payne, Aylesbury, Bucks.
Four Photographs of Archdeacon Bickersteth.

Mr. James Russell, Market Square, Midhurst.
Photograph of Dunford House, Residence and Birthplace of Richard Cobden, Esq., M. P.

Mr. John Frew, 7, Railway Terrace, North Shields.
Photograph of Geo. O. Trevelyan, Esq

Mr. James Beckett, Queen's Park, Glasgow.
Two Photographs of Rev. David Russell.

Mr. James Burke, 44, Lower Ormond Quay, Dublin.
Photograph entitled "A Tipperary Boy going to Coort"

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 324.—*November* 18, 1864.

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COLLODION IN PRINTING WITH CHLORIDE OF SILVER.

WE described a few weeks ago the somewhat singular and hitherto unknown or unrecognized fact, that chloride of silver could be held in collodion, and thus rendered available for printing. That iodide and bromide of silver could be employed in collodion we had proved years ago, but that these were to some small extent soluble in alcoholic solutions of the alkaline iodides had been understood from the early days of the collodion process, when Dr. Diamond published in *Notes and Queries* a formula for collodion containing iodide of silver. But the idea of using collodion as a vehicle for holding in suspension chloride of silver had never been suggested. Chloride of silver, it is known, is soluble to slight extent in solutions of the alkaline chlorides, and as some of these are also more or less soluble in alcohol, a small portion of chloride of silver might be dissolved, but as the excess of the alkaline chloride would render this quite insensitive, it was altogether useless for printing purposes. When, therefore, it occurred to us to make the experiment we recorded, it was scarcely with much hope of the result we sought. In our first experiment we simply proved the fact that chloride of silver might, by the method we adopted, be held in suspension in collodion in such a state of minute subdivision as to produce something like an emulsion, free from turbidity or perceptible particles, and without any tendency to precipitation; and that this preparation poured upon paper was sensitive to light; the example which we tried, however, not darkening with prolonged exposure beyond a deep purple or grey.

Since our first brief intimation of the fact we have tried a few further experiments with marked success, and our suggestion has been further tested by a gentleman well known as an elegant experimentalist and successful manipulator, Mr. H. Cooper, whose results have been equally satisfactory. In our own experiments, we dissolved in the first instance six grains of nitrate of silver in an ounce of collodion, and then having dissolved two grains of chloride of sodium in a few drops of water, added these to the collodion, drop by drop, agitating between each; this decomposed the nitrate and produced the emulsion of chloride of silver which we described. As we before stated, this collodion was insufficiently sensitive, requiring long exposure and lacking vigour. The addition, however, of three or four grains per ounce of nitrate of silver produced a most satisfactory change in the conditions, by giving the necessary proportion of free nitrate to print well.

Paper prepared with this collodion and exposed under a negative, gave a picture of exceeding delicacy, without any lack of vigour, being only distinguished from one produced on albumenized paper and with an ordinary nitrate bath by possessing more marked gradation and modelling. This was toned in an acetate toning bath, receiving a fine tone without difficulty; it was then fixed in a solution of sulphocyanide of ammonium, and washed. A print so produced was placed side by side with an ordinary silver print on albumenized paper from the same negative, before one of our first portraitists for his judgment. He, unhesitatingly, decided in favour of the collodion print, as finer in colour, and possessing more transparency in the shadows, without any lack of vigour, and as possessing a fine surface without offensive gloss. Mr. Cooper's mode of proceeding was to dissolve five grains of chloride of magnesium in an ounce of collodion, and then having dissolved twenty grains of nitrate of silver in a few drops of water, added this to the chlorided collodion. He describes the image produced as having the same characteristics we have mentioned, a peculiar softness and delicacy of gradation.

Another singular fact we have noticed, and which has been confirmed by Mr. Cooper, is, that the image is in this case entirely in the collodion film. We removed a portion of the film, and found the paper underneath without a trace of the image, or any discoloration of any kind. The condition often sought, by which the image may be retained entirely on the surface, is thus obtained.

The conditions by which large sheets of paper may be most easily coated with collodion require a separate consideration. We have already indicated that by dispensing with ether in the manufacture of the collodion one of the chief difficulties, which would be caused by the rapid evaporation of that body, will be eliminated. Mechanical appliances may also possibly be contrived which will facilitate the operation. Some ten years ago M. l'Abbé Laborde described an arrangement for coating large plates of glass with collodion, which, as it may be suggestive, we will extract here:—

> On a piece of board, a little broader and slightly shorter than the glass plates employed, fix at each side a rule or lath of wood, forming thus a 'rebate,' in which the plate of glass will slide freely. The two ledges must be sufficiently thick to rise about a sixth of an inch above the surface of the glass. Another glass plate, rather wider, is then fixed upon the top of the ledges so as to form a kind of cover, distant about a sixth of an inch from the sliding-plate and parallel with it. Both glasses should be about an inch and a half longer than the board in the direction of the length of the raised edges. A hook or stop must be fixed on one end of the board to prevent the moveable glass plate from slipping off.
>
> To use this apparatus it must be laid on a level table, and the sliding-plate (that to be coated with collodion) drawn out from under the fixed plate, as one would pull out a drawer, to the extent of about one-third. The quantity of collodion supposed to be necessary to coat the whole surface is then poured on at once, and the moveable glass plate pushed in quickly under the fixed one. In this condition the collodion lies in an atmosphere of ether, between the two plates, which prevents evaporation. The board with the plates must then be taken in the hands, and moved in various directions, so as to make the collodion flow over all parts

of the glass, and, finally, any overplus must be allowed to drain from one of the projecting corners into the bottle.

The slow coagulation of the collodion gives great facility in spreading it evenly, and the waves or streaks disappear of themselves. Dust is likewise excluded.

In order to take advantage of the tendency of collodion (as of liquids generally) to stop at the edges without running over, the ledges and the stop should be bevelled inwards toward the sliding-plate of glass, so as to allow the upper surface of the latter to rise a little above them, and be free all round its edges.

How far the use of chloride of silver in collodion may become available to a practical extent we do not now conjecture; but it is certain that for the purposes of the amateur in readily proving a negative, and for some other uses it will possess advantages well worthy of consideration.

COPYRIGHT IN PHOTOGRAPHIC PORTRAITS.

If recent decisions regarding the copyright of photographic portraits be regarded as precedents, the value of the Copyright Act to photographers must become practically nullified. The Act is confessedly less clear and precise in its statements than is desirable; but notwithstanding this, we think there is no room for doubt as to its intention in vesting the copyright in any work to its author, except where such work is a commission, for which the author receives a good and valuable consideration. The vagaries of counsel and eccentricities of judges have, however, plunged into almost inextricable confusion any little portion of the Act which was free from ambiguity. The fact that a photographer complains that he is robbed daily of his property in his own works, that he has suffered to the extent of at least £100 in regard to one portrait, which has been pirated, seems to afford the court material for infinite merriment, and lawyer and judge vie with each other in the use of the *argumentum ad absurdum*. Mr. Lewis contends, that the author of a photograph is "the person who sits," and the judge adds, "unless it be the sun!" Does Mr. Lewis, then produce a portrait every time he "sits?" or does the sun produce a photograph of the worthy commissioner whenever it shines upon him?

The case to which we refer was heard before Mr. Commissioner Kerr in the Sheriff's Court last week, and judgment delivered a few days ago. The action was brought by Messrs. Maull and Polyblank, against a photographer named Goss. There are some points in the report, which we take from a daily paper, which are not so clear as we should like; but as we had no intimation of the case, we had no representative present in court. The case is reported as follows:—

MAULL AND ANOTHER *v.* GOSS.

This was an action to recover £10 damages for an alleged infringement of the carte de visite of His Royal Highness the Duke of Cambridge.

Mr. Bowen May appeared for the plaintiffs; Mr. F. H. Lewis representing defendant, an artist, of Cheapside.

Mr. May, in opening the case on behalf of the plaintiffs, said he appeared as the advocate of the Photographic Association; but plaintiffs, although they belonged to it, were fighting the present case singly and to protect themselves against piracies. There could be no doubt that plaintiffs had suffered to the extent of £100, but they only went in this instance for £10, so that for the future it might be understood these piracies might not be carried out with impunity.

Mr. Maull said—This is a carte de visite of His Royal Highness the Duke of Cambridge, who sat to my firm for it. It was taken August 11th, 1862, and it was duly registered. We are owners of the negative and copyright. This is the piracy copy, no doubt taken from our original. His Royal Highness gave us permission to publish the carte de visite, and I have no doubt that this was copied from it. There are accessories in this picture which could not be in the possession of anyone else.

By his Honour.—I mean the carpet, table, &c.

By Mr. May.—First knew defendant was selling them in September.

Cross-examined.—The Duke sat August 11. He sat at our request. We considered it a great benefit. The Duke did not pay for his sitting, but he paid for the copies. He paid £4 4s. for 100 copies. We have not authorised the Photographic Association to mention our names. We left the matter in Mr. May's hands. I do not recollect that the defendant wrote a letter disclaiming all knowledge of the sale.

Re-examined.—His Royal Highness paid no fee. We simply requested a sitting for the purpose of publication.

Mr. Fox (plaintiffs' manager) proved purchasing the copies produced at defendant's shop. There is no doubt of the piracy. I am an operator. We sold 8,000 to 9,000 portraits of Garibaldi in ten days.

Cross-examined.—Plaintiffs have published another portrait of the Duke of Cambridge, in his military dress. I should think 3,000 of the military portrait were sold. I believe the Duke sat to another photographic firm some years ago.

His Honour.—Do you object that they are not authors?

Mr. Lewis.—That is one of the objections.

Mr. Maull (recalled by Mr. Lewis).—We took several negatives. The negatives were taken representing His Royal Highness in the same position.

Mr. Nottage, manager of the London Stereoscopic Company, Cheapside, said—This copy is evidently a copy of the plaintiffs'.

Mr. May.—I believe that you have lately taken a carte of Lord Palmerston?

His Honour.—Oh, we have nothing to do with Lord Palmerston.

Mr. Lewis called his Honour's attention to the Act, and

His Honour said there seemed to be a difficulty in the Act.

Mr. Lewis contended that there was no case, and quoted the 1st section of the Act, by which it would be seen that before plaintiffs could have any authority to claim a copyright, they must have the permission of the Duke of Cambridge in writing. Now plaintiffs had only a verbal permission, and could not claim to be the proprietors.

Mr. May contended that the negative never belonged to the Duke of Cambridge, who had merely bought copies as an ordinary purchaser.

Mr. Lewis.—Then it comes to this—that any person's photograph might be produced, whether he liked or not.

His Honour.—That would be so. The Act is very indistinct. I must take a note of the objections. The first is that there was no agreement in writing; the payment afterwards by His Royal Highness made a good consideration; the sitting of the Duke was also a good consideration.

Mr. Lewis.—Then, there was no registration in accordance with the terms of the Act. The time of the first publication is not registered as required.

His Honour.—This is not driving a coach and six through an Act of Parliament, but several railway vans. I think sections 6 and 11 are incorporated.

Mr. Lewis.—I contend that the author of a photograph is the person who sits.

His Honour.—Unless it be the sun. The object of registration is to give notice to whom the property belongs.

Mr. May argued upon the objections.

His Honour.—I think the objection upon the registration, and there being two negatives, is fatal.

Mr. Lewis then addressed the jury as to the damages in the event of a verdict being passed for the plaintiffs.

The jury found for the £10 claimed, and his Honour reserved his judgment.

A week later we learn that the Commissioner delivers judgment nonsuiting the plaintiff; on what ground it is not stated. After stating in answer to a question that no appeal was admissible, but that as the case stood the action could be brought again, the plaintiffs were formally nonsuited. The somewhat unsatisfactory act of nonsuiting the plaintff, after the case has been fully heard, and the verdict of the jury given, is a subject belonging to legal practice, upon which we shall make no comment. The nonsuit, it is probable, is based upon some irregularity or incompleteness in the registration; but as to the merits of the case we have one or two remarks to make. It is clear from the evidence of the plaintiff that in this case the portrait was in no sense a commission. Unlike the case of ordinary portraits in which the photographer is employed by the sitter, this is one which clears the subject of all doubt or ambiguity. The Duke sat at the request of the plaintiffs, who desired him to sit in order that they might publish his portrait. In this case the Copyright is vested in the author of the portrait in distinct terms, without any ambiguity whatever, and admitting of no kind of doubt. No agreement is in such case required: the author has produced a work for himself, and after he has duly registered it, he is entitled to the fullest protection the Act can afford. The above objections of Mr. Lewis scarcely demand an answer. What answer can be

given to the nonsense that the sitter is the author of his own portrait? If so, why should he trouble the photographer? Or what can be said to his notion that the sitting was in itself a good consideration? Even if the Duke's condescension in sitting were to be regarded as a consideration, it at once loses all value if the photographer's property in his work be denied the protection which this law has provided. The recurrence of cases of this kind will demand grave consideration from photographers, and a united effort in the forthcoming session of Parliament to procure the insertion in the new consolidated Copyright Act of such clauses as leave no doubt of the nature of their claims, or difficulty in the mode of enforcing them, and claiming redress when they are infringed.

EARLY EXPERIMENTS AND SUGGESTIONS IN URANIUM PRINTING.

As it is probable that a large number of our readers are not familiar with the early experiments in uranium printing, a *resumé* of what was done before this journal was established may be interesting and suggestive. We believe that Mr. Burnett commenced his experiments with uranium as early as 1855, and in that year exhibited some specimens of printing produced with this metal. It was not, however, until the year 1857 that the subject was fully placed before photographers. In February, 1857, Mr. Burnett read before the Photographic Society of Scotland a very comprehensive paper, which contained, amongst other things, some account of his uranium experiments, from which we make the following extracts:—

In the first process, the paper being charged with the uranic salt, and exposed to the solar influence under the negative to be copied, is washed with a solution of the ferridcyanide or red prussiate of potash. * * * * I have used for the solution of the uranic oxide for this process, a variety of acids with very similar results; the sensitiveness of the prepared paper to light, however, varying much. For instance, a collodion negative with the hydrofluate paper, produced a very good print in half an hour of unsteady sun, while with a paper prepared with the tartaric acid solution of the oxide, it gave an equally good impression in less than five minutes of the same intermitting sunshine, indicating thus a difference of sensitiveness of 6 to 1 in favour of the tartarate. The rationale of this process is the reduction of the sesqui-oxide of uranium U2 O3, on those parts of the paper exposed to the solar influence, to a lower state of oxidation, the proto-oxide U O, the salts of which have the property of forming with the soluble alkaline ferridcyanides a rich chocolate brown precipitate, while the salts of the sesqui-oxide are destitute of this reaction. Hence, the brown deposit on the parts of the picture on which the sun has been allowed to act when the developing solution is applied, and the absence of any such appearance on those parts which have been protected from his influence. As to the manipulatory details of this process, the paper (Canson's is what I have used), should be floated on the solution of nitrate, tartrate, or other salt used, in a dark room and hung up there to dry, and then preserved from light in a portfolio. If carefully secluded from light it appears to keep well. After exposure for the proper time under this negative, there is, in some cases, scarcely any visible impression, while in other cases, particularly when using the tartaric acid solution, I have found the impression very distinguishable of a brownish or blackish shade, although still quite faint.

The development is best conducted by floating it, anything like rubbing the picture being very objectionable. On the solution of the red prussiate, I use a quite strong solution, but if kept from daylight and occasionally pouring off any sediment, and more of the red prussiate added if it becomes weakened, it will serve for a good many developments.

When the picture has fully come out, which is generally from three to ten minutes at the very most, it is removed from the developing bath, placed in cold water, and washed very gently for a few minutes, the water being frequently changed till it ceases to acquire a yellow tinge from the dissolved red prussiate. The picture is then drained from the water, pressed between folds of blotting paper, dried (I dry in the dark), and the process is complete.

There remains but one class of uranic photographs to be described, namely, that obtained when we develop with a salt of silver or gold (or platinum?). This class may be made to print much more rapidly than our ordinary silver printing process, approaching sometimes more nearly to the calotype development in this respect. We get the *minutest details* with great fidelity, and the picture is effectually fixed by simple fresh hyposulphite solution, with a good colour in many cases (at all events as may be seen in the exhibition), or by ammonia, which will be considered an advantage by those who hold the hyposulphite an enemy to durability. Different shades of colour are produced according to different solvent acids and different details. I have got a good black, perfectly like that of an engraving, by the nitrate of uranic oxide, developed by ammonia nitrate of silver (or plain nitrate), and fixed by plain hyposulphite without any colouring bath. One in the Exhibition was so manipulated in May last, and still shows no signs of decay. I have also obtained prints of blackish grey, or red grey, changing into the pure grey by exposure to an hour or two of sunshine, by preparing and developing in the same way, and fixing by a weak ammonial solution. Some not exposed long enough for this, and kept shut up, have been since gradually changing in the same direction. I plead guilty to a strong predilection for ammonia as a fixing agent. We get rid of the much suspected hyposulphite, and any injury to the print is open and visible at a glance, and may be at once guarded against by a slight over-printing or over development; at all events, even though we do not use ammonia with the nitrate, tartarate, and some of the other salts of uranic oxide, we may get a good colour and avoid old hyposulphite and gold solutions. I have tried the hyposulphite of gold on some of the silver-developed prints prepared with the hydrofluate of the uranic oxide, and fixed with ammonia, which had an exceedingly unpleasant raw red colour; a very agreeable grey was at once produced. I have succeeded in getting very beautiful impressions by development of the uranic papers, by chloride of gold alone. There can be little or *no* doubt of the permanence of such photographs, and I cannot help thinking that this, and the Ainslee development, of the paper prepared by the sesqui-salts of iron, as described by Sir John Herschel, under the name of Chrysotype, are deserving of trial as *practical* printing processes, as also, perhaps, for use in the camera.

I have experimented with uranium development on a considerable variety of the uranic oxide salts, tints varying much, but also much affected by lesser details. I name the following:—nitrate, hydrochlorate, oxalate, formiate, benzoate, hydrofluate, succinate, tartarate, ammonia-acetate, citrate, which is, in some respects, a very convenient salt. The uranic oxide dissolving in the citric acid solution with remarkable ease, and the silver salts which result from the mutual decomposition being insoluble, may, in some respects, be a convenience. The nitrate and the tartarate, among others, give very pleasing results. On paper prepared with the uranic nitrate solution (the strength being 40 to 50 grains to the ounce of water), I obtained a very distinct, though not sufficiently filled in comparison from a collodion negative, developing by nitrate or nitrate of silver, after fifteen seconds of exposure to sunshine, or considerably better filled up by ten seconds of exposure, by adding to the nitrate of silver developer a small quantity of the protosulphate of iron solution with acetic acid, or gallic acid and acetic acid mixed. The silver, with protosulphate, or other proto-salt of iron solution, applied to a longer exposed paper gives a very intense deeply-printed black. Impressions of ferns have been developed on the uranic tartarate paper, after exposure to gas-light, not only by silver solutions, but by the ferridcyanide, and as this latter developer requires the action to have gone on much farther before any very decided symptoms of action are perceived, this tartarate paper might perhaps prove sensitive enough to be available for the camera. We saw already that the tartarate was much more sensitive to light than the nitrate, and I suspect that some of the other salts possess yet greater sensitiveness.

Early in the following year M. Niepce de St. Victor, in a memoir to the Academy of Sciences, Paris, brought forward the subject of uranium printing in connection with his "absorption of light" theory, ascribing the photographic value of uranium salts to their power to "absorb light." Whether M. Niepce de St. Victor was an independent discoverer, never having heard of Mr. Burnett's researches or not, we cannot say: but it is certain that he attempted to gain a patent in this country for a process which had been published more than twelve months by Mr. Burnett. M. de la Blanchere, following up the French experiments, reduced the process to a definite formula, from which we make the following extracts:—

It results from the experiments of M. Niepce de St. Victor that light acts upon the nitrate and all the salts of uranium in an analogous manner; it renders the nitrate insoluble in the parts it has acted upon; consequently it is advisable to keep the flasks and solutions secluded from the light. It is equally indispensable that the paper used should not be salted, and that it should have been kept in the dark. Without these precautions the isolated parts become spotted under the action of the nitrate of silver.

M. Niepce has lately described the mode of obtaining the three kinds of positive proofs; with nitrate of silver alone, with chloride of gold, and with bichloride of mercury. The mode of operating with each of these three is as follows:—

1st. With the nitrate of silver 20 parts of nitrate of uranium must be dissolved in 100 parts of distilled water. This gold-coloured solution is then filtered, and preserved in a well-stoppered flask and in a dark place. When it is desired to operate, this solution must be poured in a basin, and the paper immersed therein and allowed to float on its surface for five minutes. M. de la Blanchere thinks that the liquid ought not to penetrate entirely the substance of the paper, as would be the case if the paper were retained beneath the surface of the solution, since that tends to cloud the proof. If the paper be submitted a second time to the bath, it increases the sensibility.

The paper must then be suspended in the air, but in darkness. In this state it preserves its sensibility for an indefinite period. The sheet thus prepared is exposed under a negative; the exposure will be from one to ten minutes in the sun, and from fifteen minutes to an hour in the shade or in dull weather. In general from three to five minutes in the sun suffices for a negative upon collodion of ordinary opacity. At this season images have been obtained in one minute, and under a fine summer's sun some seconds would suffice. Upon the time of the exposure depends the beauty of the proof, and this is without doubt the most delicate part of the process. It is necessary to expose enough, but to stop a little under the intensity it is desired to attain, because, in prolonging the time in the developing baths which follow, the picture gains in vividness. The yellow tint of the paper alters itself, passing to a red-brown after exposure, on the parts acted upon by the light. This colouring is more apparent in transparence; its degree of intensity serves almost always (but not absolutely) to judge of the instant when it is necessary to arrest the luminous impression. To be in favourable condition, the picture ought to be but slightly visible on taking it from the frame.

If it be kept in obscurity, it may be left for 24 or 48 hours before being developed. The developing solution is composed of

Distilled water	100 parts
Nitrate of silver	6 parts.

The proof being plunged rapidly in this bath is developed instantaneously, and is completed in the space of from thirty to forty seconds. It should have a grey sepia tone, which turns to a brown sepia on leaving it for ten minutes in the bath; but the whites have a tendency to tint themselves at the same time as the blacks, in such a way that these proofs never equal those that a proper exposure produces in 45 seconds.

After the bath the proof is to be washed in two or three waters. From that time the proof is unassailable by boiling cyanide of potassium. The chlorides and the aqua regia alone can alter it. If bubbles form on its surface when it is plunged into the bath, this gives no cause for alarm; the liquid penetrates sufficiently to cause them to burst, and they leave no trace.

Sometimes numerous small red spots are formed at the back of the proof, which arise, no doubt, from a deposit floating in the bath. It sometimes happens also that these show themselves on both sides of the paper, but without corresponding, which proves that they exist only on the surface. It is not yet known how to remedy this accident, which occurs, however, but rarely.

If the silver bath is not sufficiently acidulated when the sheet is taken out to be plunged in the water, the blacker parts, that is to say, those more impressionable, colour themselves of a yellow citron; this tint will disappear in the bath of chloride of gold, of which we are about to speak. It even disappears on heating the proof before a clear fire to dry it, and these parts acquire a very vigorous dark brown.

2ndly. Process with the chloride of gold.—When the proof is taken out of the frame it is plunged into a bath composed of 2 grammes of chloride of gold (increased by some drops of hydrochloric acid) dissolved in 1000 grammes of distilled water. It appears instantaneously (perhaps even more quickly than in the nitrate of silver) with blue tones, rather cold, but which may deepen to a black, if the exposure has been prolonged. To obtain the effect, the time of the exposure should be almost double that necessary for operating with the nitrate of silver.

The picture must be rapidly withdrawn as soon as it is completely developed, and washed in two or three waters. It is then fixed, and acquires much vigour if dried at the fire.

The real and the best use of this bath is to make the washed picture developed in the silver bath turn to a violet black. Its action should be prolonged during a period sufficient for the toning to be completed, which does not take place sometimes for about ten minutes. The most successful proof will be almost entirely brown on emerging from the silver bath; but the chloride of gold dissolving the nitrate of uranium, even when insolated, tends to clear the pictures when too much developed or covered with a veil.

3rdly. Process with the bichloride of mercury.—This salt serves to give to the proofs grey-black tones, and the black of engravings. It is necessary to commence by strongly exciting the paper prepared with the nitrate of uranium, by submitting it to an exposure three times as long as in the two cases described above, because the uranium-compounds being soluble in chlorides, they tend in subsequent operations to remove, not only the parts preserved from the light, but also those upon which it acts.

After the exposure, the proof is plunged in a bath composed of ordinary water 100 grammes, and of bichloride of mercury to saturation, at a temperature of 10° Centigrade. If it be hotter, the solution will be too energetic, and it will be necessary to dilute it with water. In this bath the proof loses its colour after remaining from two to eight minutes; it reaches the proper point when the paper has become white. It must then be washed with care; then passed to the silver bath, and the picture developes itself slowly during from ten to fifteen minutes, and acquires more and more vigour until it arrives at a black. It takes a longer time to reveal itself in proportion to the time it took previously to decolorize itself in the bi-chloride.

It is then washed in several waters, and the operation is complete.

General Observations.—If the exposure has been too long, or the stay in the silver bath too prolonged, so that the whites of the picture are clouded, they may be decolorized by washing the proof with a water freely charged with hydrochloric acid. It will form a little chloride of uranium entirely soluble.

If positive paper be used already salted, red tones are obtained and yellow grounds. The acidity of the nitrate of uranium immediately coagulates the albumen in which it is poured; consequently, one cannot as yet make use of albumenized glasses, but gelatinized and albumenized paper may be used. M. de la Blanchere used Saxony paper, placed, during five minutes, on gelatine solution, which he afterwards floated for ten minutes upon a bath of 20 parts of nitrate of uranium to 100 of water. The proof is much more superficial than when non-gelatinized paper is used; it seems also more vigorous and of greater delicacy.

It is remarkable that it does not appear upon the film of gelatine on being withdrawn from the positive slide; but it develops itself rapidly in the silver bath.

The nitrate of uranium mixes well with the gelatine on glass. It may replace the bi-chromate of potash in its application to lithophotography, because it gives very pure and very sharp reliefs. It will serve equally well for engraving, because the parts become insoluble, may be rendered solid and unassailable, and hence to allow the bite.

The nitrate of uranium may be dissolved directly in iodized collodion; in taking pharmaceutic collodion with 3 per cent. of pyroxyline, one has a thicker film and a more intense picture. The collodion is allowed to dry, and one can print by contact positives of an extreme delicacy, which are perfectly adapted to transparent stereoscopic proofs. One may likewise leave iodized collodion to dry upon glass, then plunge the glass for ten minutes in a bath of 20 parts of nitrate of uranium to 100 of water, let it dry, and act as above; but in this case the image will be a little less vigorous.

M. Niepce de St. Victor expressed his conviction at that time as follows:

The photographic pictures with a salt of uranium, combined with salt of gold, of silver, of mercury, resist, without disappearing, the energetic action of a boiling solution of cyanide of potassium; aqua regia alone can alter them. Everything therefore, leads to the hope that pictures taken in this way will be much more stable than the photographs taken by the present process, and that this new mode of printing positives, so very simple and rapid, is the sought for solution of the important problem of the absolute fixing of photographic pictures.

M. Humbert de Molard, and M. Brisbane however, distinctly denied the truth of the statements. As we have before remarked the question as to their power to stand these destructive reagents was of much less importance than their power to resist the ordinary causes of fading.

(To be continued.)

NEW METHOD OF PHOTOGRAPHIC PRINTING.*

BY THOMAS FOX.

I beg to submit to your notice a process of printing without nitrate of silver; it is very simple, very rapid, and the ingredients required are of the cheapest, and at the same time it produces pictures very distinct, the shades of an intense black, equal if not darker than any known process, and which will not fade from ordinary exposure, from the known

* Read before the Photographic Society of Scotland.

chemical combination of the materials used, It is the exact counterpart from printing with nitrate of silver, and whitens the paper where exposed to light, the shaded parts becoming black, and yielding very fine and soft gradations of tone when treated with the following simple process.

The process consists of bringing the bichromate of potass in direct contact with logwood; and the plan I adopt is to sensitize the paper with a solution of the bichromate of potass and sulphate of copper, mixed in the proportions of one part of the former to two of the latter, and to either float or steep the paper for a few minutes, then dry it by the fire in the dark (this paper will retain its sensitiveness for some days, if carefully preserved from light); you then place your copy to the sensitive side, if a glass transparency, with the printed side down, and with a paper print, either with the printed side down or the plain. With the printed side down you get a reversed picture, but which suits admirably for transferring. The time of exposure is much the same as in printing with nitrate of silver: in sunshine from one to three minutes is amply sufficient for glass, and for a paper print or piece of printing it will be rather longer, according to the thickness of the paper; the thinner it is the better. Of course, in dull weather it is proportionably longer; at the same time I would say, paper thus prepared is much more sensitive than the silvered, and will print considerably quicker.

I have then a strong decoction of logwood ready, and filter such a quantity as will float the print; I add a little hot water to hasten the development, float the sensitized picture from half a minute to a minute, print-side down, and then, holding it by one corner, gradually raise it from the logwood: a perfect delineated copy is the result. I then dip it in hot water, which carries off the superfluous logwood that may be hanging to the paper, then dip it in hot or cold water, and varnish. This gives a very distinct picture, with the shades of a deep black, and the lights of a rather greyish-yellow tint. In order to obtain a white ground, I use a weak solution of alum, put in hot water.

The same logwood will do a great number of prints. The sensitizing solution retains its power until dried up. There is no danger of baths going wrong, as in the silver baths; and tedious process of toning, &c., is avoided, not to speak of the great uncertainty and variations in these processes; and it will do all that the carbon process professes to do in transferring, &c. The whole process may be done in a few minutes: the paper, being sensitized and dried by the fire at once, may be immediately exposed, developed, and varnished.

For transferring the unvarnished print, I simply pass it under a roller-press, which gives a beautiful impression on albumenized paper, leaving the ground pure white; it also transfers to cotton, linen, glass, stone, wood, and any other material.

I may mention that by varying the strength of the sensitive solution, and the intensity of the logwood, many different shades of colour may be obtained, as you can get blue and purple, and deep black to the lightest shade of black. I see no reason why this process may not also be used in the camera, with an albumen or other transparent medium, using logwood as a developer.

I would also take this opportunity of mentioning that it is above a year since I first began these experiments, and made them with plain paper. Some of these I forwarded to your President, Sir David Brewster, who was kind enough to acknowledge them, and recommended me to continue these experiments. I found that the plain paper did not clear in the lights well. I tried salted paper, which gave very good results, but still dark in the lights; I then tried albumenized paper, and as yet find it best; but I believe gelatine paper would perhaps be best.

It is, I believe, as yet by far the simplest and quickest process that has been brought out, consisting simply of this:—

1st. The sensitizing solution, easily made.

2nd. The logwood, equally so,

And in working these it is equally simple and sure. Float the paper for five minutes, or shorter if steeped; expose for a short time (observation will determine the time); then develop with logwood, and the whole operation is done, with the exception of varnishing, which is just poured over the picture. For this process I have obtained letters patent; and, from the pictures produced, I hope you will think favourably of the first results made public. I have no doubt that they may be greatly improved upon further trial; and I trust that these, my efforts, may not altogether be unworthy of the notice of your Society.

THE LATEST NOVELTIES BY ART-CRITICS ON PHOTOGRAPHY.

BY MOSES PRIMROSE, OF WAKEFIELD.*

Why cannot the art-critics understand us or let us alone? I don't ask that they should appreciate our labours, but I don't think it would be asking too much of them to learn a little of the rudiments of a simple matter like photography when they write about it. The Wothlytype has drawn out a variety of notions from the papers and journals, a pat on the back almost painful from the *Times*; the three degrees of comparison beginning at the top—at first they were *superlatively* superb, next *comparatively* beautiful, and now they are *positively* good—from the photographic journals; extreme caution having now set in. A delightfully ignorant article follows in the *Art Journal*, and the supposed permanence of the process has given the *Reader* an opportunity of saying that it is very sorry for the attainment of this quality, because it considers that photographs are not worth keeping.

All these notices crow over the fact that salts of silver are entirely done away with in photographic printing, yet the fact appears that the Wothlytype image is formed entirely of silver and gold, and not a trace of uranium is left in the paper. Hear the *Art Journal*, "Herr Wothly has achieved his wonderful success by the absolute substitution of the salt of uranium for nitrate of silver." "The public will recognise only one of the merits in this new agent in photography—that is truly its great glory—the perfection and beauty with which it renders all surfaces; but to the photographer it is, moreover, an economy of time and money. Such are the eccentricities of the nitrate of silver that a dozen plates may be taken under conditions as nearly alike as can be determined, yet no two of these plates shall yield precisely similar prints. Whereas for the working of this salt of uranium there is a formula according to which available results are certain." I wonder what all this means, it is new to me that the Wothlytype is available for the production of negatives. Can it be that the directors of the Association have been "cramming" the clever writer? If I rightly understand the matter, the Wothlytype process possesses merits of its own, and does not need the questionable aid of these silly puffs, which will inevitably do much to bring it into contempt. Perhaps the most comic part of the *Art Journal* article to a photographer is the following:—

> We are indebted to the courtesy of Colonel Stuart Wortley for permission to examine some prints obtained by the Wothly process, of which it is saying nothing to state that they are far beyond the cunning of any known manipulative process. One is especially interesting from the variety of textures it repeats. It is a piece of garden ornament, taken in Italy by Colonel Stuart Wortley himself, two years ago, and the phenomena in connection with it are its harmonious breadth, its gradations of tone in foliage, its depth and faithful repitition of subdued light in dark passages, and, not less valuable than these, its perfect maintenance of texture in every degree of light. In landscape photography, nitrate of silver renders near foliage heavy, massive, and opaque. The subject described may not be sufficient to enable us to determine signally in this direction in favour of the salt of uranium,

* Our contributor informs us that his father, the vicar, has suggested after reading his MS. that he should assure us that he had sold the last of his gross of "green spectacles with silver rims and shagreen cases,' before writing his communication.

but it would appear that it repeats with perfect fidelity the natural scale of tone, indispensable to form and lightness. The portraiture we have had the opportunity of examining is also in the possession of Colonel Stuart Wortley. The figures would, in full length, measure about nine inches, a size extremely trying to obtain presentable by the silver process.

The negative mentioned was taken two years ago, and a very beautiful one it is, long before the Wothlytype was invented, yet uranium gets the credit for giving "harmonious breadth," "faithful repetition of subdued light in dark passages," and all the wonders that are described in the Art jargon in which the *Art Journal* delights. And yet that "poor thing," nitrate of silver, which "renders near foliage heavy, massive, and opaque" did it all. It is also quite new that uranium renders full-length figures, measuring about nine inches, "a size extremely trying to obtain presentable by the silver process." Please treat your readers to another little bit, and they will have had enough of the *Art Journal*.

It is enough here to allude to the extreme difficulty, even under favourable circumstances, of obtaining anything like a perfect figure of the size of nine inches by means of silver. The very best photographs of this size have some defects that must be remedied by touching; but, in the figures of which we speak, there is no point to which a brush could be applied without ruin to the print. In one of the portraits, that also of a lady, the figure had moved, but in a degree so minute as to be discovered only by the eye of a practised photographer. The effect of this, with most perfect definition, was a softness most enchanting to a painter—a kind of accident which twenty attempts might be made in vain to reproduce.

The *Reader* goes upon another tack, it says that permanence is not a desirable quality in photography; this is quite a new idea, but has its reasons, and here they are:—

There can be little doubt that the film of collodion—which, under Wothly's process, is rendered sensitive, not by nitrate of silver, but by being combined with the salt of uranium—would yield a far better surface to the action of the light; and the impressions fixed upon it would be free from all those blots and inequalities which mark more or less all photographic impressions hitherto produced. This alone is a great gain. The other advantages claimed by the inventor—of absolute permanence and simple and easy manipulation—are not so clearly established; but there seems great reason to think that an important step in advance has been made. Time alone can be accepted as the true test of all claims for permanence; but the impressions obtained by the new process are said to have been exposed to the action of the sun and rain for weeks together without betraying any sign of change. A condition of absolute permanence is scarcely conceivable, and, in the case of photographic pictures, hardly desirable. A visit to a photographic exhibition raises no wish to secure its contents for an admiring posterity. Here and there we might wish to preserve from decay the semblance of a great man; but our descendants might think the bequest greatly encumbered if it were accompanied by a crowd of the Browns, Joneses, and Robinsons of our generation. Photography is levelling and undiscriminating. Brown and Jones make as good or better photographs than men of the stamp of Newton and Napoleon. We do not recognize men by the light of their photographs, though we usually recognize photographs when we have become familiar with the countenances they represent. A great portrait, directed by a human brain and executed by a human hand, is worth all the photographs ever produced by the sun. On canvas or in marble let us preserve the resemblances of our great men for the benefit of our children, and take little heed about the permanence of photography as far as they are concerned. Again, in the production of photographic impressions of landscape, absolute permanence is not greatly to be desired. The real beauty and important truths of nature are never represented, and no photographic picture conveys the impression which is made upon the mind by a sunlit landscape. There is nothing valuable about it but correct perspective; even natural forms are distorted by a false light and shadow, and require that truthful interpretation by an accomplished artist, of which we have an instance in the background of Mr. Herbert's fresco, to set those before us in their real and true proportions. In its application to architectural forms photography is more successful; but even here it merely records one of many truths. Take up, for example, a photograph of the Coliseum. We shall find, indeed, an accurate representation of the surface of the stones; but, of its immensity and beauty, not a notion will be conveyed to one who, not having seen the building itself, is unable, as it were, to bring to the aid of the black and white map before him the complete impression fixed upon his memory. The slightest sketch by an able painter will be infinitely more true, though in all probability, when compared with the photograph, it will be found very inaccurate. The power of representing surfaces with marvellous verisimilitude is exemplified by the results that have been obtained by exposing to the lens the snow-surfaces of the Alps; but the effect of light and shade in the photographs of Alpine scenery is so entirely false that they excite no feeling in us save the passing excitement of our curiosity. We have certainly no reason to desire that they shall become absolutely permanent. It is useless to talk of the truth-rendering art, and waste of time to labour in the direction of rendering its impressions permanent; infinitely more gratitude would be due to him who should discover a means of arresting the decay of "The Last Supper," or "The Peter Martyr." When we know that these and others, the greatest works the world ever saw, are gradually fading and passing away, we almost feel insulted by a discovery which threatens to preserve for ever photographic impressions that may be thrown off by any one possessed of leisure and a hobby at the rate of a thousand a week.

These be as "prave 'ords" as ever were uttered by *Ancient Pistol*, and quite in his vein. But do they mean anything? Does the writer expect anyone to believe that what is worth producing is not worth preserving? To put the matter more closely will he venture to assert that the whole of the painted portraits of—say Shakespeare, for instance, the Chandos, the Stratford, the Somerset, the Felton, and all the moredoubtful ones put together, would possess as much historic interest, convey as much assurance of what manner of manShakespeare really was, as one good photograph? And if it had been possible to have produced such a portrait, would this amiable critic consider it an advantage that it would surely perish?

I almost feel that I ought to apoligize to the readers of the Photographic News for commenting seriously upon such absurdities as those perpetrated by the writer in the *Reader*; but I will, without further remarks, conclude with a suggestion. Is it not possible for some of the Photographic Societies to establish an elementary class for the purpose of teaching the rudiments of Photography to Art-Critics? Or, failing that, to prepare a little manual, or even fly-sheet, for the same purpose, in which all that it concerns the art-critic to know of photography, and quite enough to save him from the folly of which he is so constantly guilty, might be comprised in a dozen distinct propositions? Or, in the event of their neglecting such aid, would it not be better if the critics could be persuaded to adopt my cousin's rules recorded in the history of my father, the vicar, when he says, "the whole secret (of criticism) consisted in a strict adherence to two rules: the one, always to observe that the picture might have been better if the painter had taken more pains; and the other, to praise the works of Pietro Perugino."

THE ART CLAIMS OF PHOTOGRAPHY.*

It must be conceded that there are other objections, which from a purely artistic point of view, may be taken to photographic portraiture, as it is now practised. The carte de visite form of portrait enjoys a universal popularity; but except that it gives you a kind of panoramic view of your friend, and gives a prominence to his best coat and trousers, which cast his features into the shade, it is difficult to find any reason for commending it. It does not give you what you habitually see, nor what you wish to remember. In any average carte you see the legs occupy as large a portion of the foreground as any other individual member or pair of members. But in your mental conception and recollection of your friend the legs do not occupy the most prominent place. When you are talking to him, or walking with him, or dining with him, you do not concentrate much of your attention upon his legs. It is his face, his eyes, his mouth, which interpret his mind to yours, and live in your memory. A carte de visite represents him as you might descry him at the end of a street, if you had a good glass. The essential vice of it is, that it brings the whole figure under your eye at a single glance—a thing which never could happen in nature, unless the person was at too great a distance for his features to be minutely visible. The vignette heads are far more beautiful in themselves, and preserve a far truer record

* Concluded from p. 559.

of that which you wish not to forget. They represent him as you know him, and as, if he were gone, you would wish to recall him. But the carte, faulty in its original idea, is still more injured by the curious plan of composition upon which it is made up. The backgrounds which some photographers employ are a perfect marvel for the elaborate bad taste with which they are arranged. We should be inclined to demur to the 'properties' altogether. Sham stiles, 'practicable' rocks, precipices in flatted oils, and the 'multum in parvo solid European accessory,' which is sixteen articles in one, and becomes a fireplace, Gothic bookcase, pianoforte, or Italian lake, and a dozen other things besides, according as you adjust it—these are wretched tricks for what claims to be, and is, a noble art. The mode in which these theatrical beauties are sometimes applied is wonderfully grotesque. We have before us a carte by one of the first photographers in London. The background is a magnificent view from the terrace of an Italian garden. Upon the said terrace is a Kidderminster carpet; upon the carpet is a cane-bottomed chair; and upon the chair is a widow lady, sitting bolt upright, without her bonnet, and with her back to the view. Another artist has a fancy for portraying the distinguished men of the day; and one of his favourite conceptions of the scenes in which statesmen may reasonably be looked for, is the base of a cliff upon an iron-bound coast, where they may be seen balancing themselves upon the apex of a jagged rock without their hats. In fact, if a foreigner were to draw his conclusions concerning England and the English from a collection of cartes de visite, he would infer it to be a country abounding in terraces, gardens, lakes, and wild sea-shores, in which the inhabitants might generally be seen sitting in the open-air uncovered, looking away from the view, or playing hide-and-seek (at the manifest risk of their lives) behind curtains attached to pillars which, for some unexplained reason, were generally erected upon the brinks of tremendous precipices. If the abolition of the carte de visite were desirable for no other reason, it would be to get rid of this deplorable partnership between the photographer and the scene-painter.

Many of these faults, no doubt, go for something in the contempt with which photographic portraiture is regarded by a certain portion of the artist world. But there is another objection more powerful and more deeply rooted which involves the whole question of the object and final cause of portraiture. The subject of reproach is not the deficiencies of the photographer, but his excellence. It is objected that he is too truthful in representing the countenance placed before his lens, and that something beyond this is asked of the portraitist. What that something else is, is not very easily to discover. In practice there is no doubt about the actual interpretation of their duties which most portrait painters adopt and always have adopted. It is their business to exaggerate every beauty, and suppress every defect, and in fact to make things as pleasant as possible, being careful at the same time to retain some trace of a likeness, so that the picture may not lose all connection with its model. It is alleged that unless an artist did this, he would not be true to his own aspirations after the ideal. It is certain that he would not consult the self-complacency of his sitters. But whether his artistic feeling, or their exacting vanity, be the motive power in operation, the result is, that egregious flattery is a very general characteristic of painted portraits. In the case of artists of the first rank, the result is to give the sitter something really much more beautiful than himself—Nature's stern reality sublimated in the operator's fervent imagination; and those who know both artist and sitter, will generally be able to trace in the expression of the pictured face a strange combination of the most conspicuous mental qualities of both. With inferior artists the effort to flatter is not so successful; but it is so vigorous, that even those who know the sitter intimately, will often not recognise his likeness until they are helped to it by the catalogue.

It is not to be denied that a great improvement in this respect has taken place in recent years, and that portraits are annually becoming less imaginative. Many causes have been in operation to encourage this reform; but the prevalence of photography, and the opportunity given to every one to compare the lens's estimate of a likeness with the painter's, have been among the most influential. It is not to be expected, however, that some of those who have been brought up to admire portraits upon the old principle, should see anything but demerit in the exactness of photography. They do not actually advance so far as to lay down that, for the purposes of the portrait, they prefer the figment of the artist's brain to a faithful copy of nature. They rather take refuge behind the idea, that the normal likeness of a man is a kind of essence distilled from all the various expressions he may wear at different times; and that what ignorant people look upon as a sheer invention of the artist's, is in reality this quintessential extract of all his expressions. The theory is rather a desperate one, for the metaphor breaks down. The mixture of two different things does not produce a third thing that is at once like both of them. You can no more find out a man's true expression by compounding together all his expressions, than you can get at the true colour of the Pope's costume by mixing together the dyes of all the various vestments which he may wear at different seasons. But the theory is worth noticing, as indicating the true direction in which photographic portraiture is capable of improvement, and in which, as the science upon which it is based advances, it will no doubt progress. The photographer at present obtains the sitter's true expression as it is at the moment of exposure; but that is by no means his best expression. The expression by which a man is remembered is that which he wears when he is animated by conversation, or by interest in some habitual occupation. That which he wears in a photographer's hot glass-house, after some minutes of despairing effort to pose himself to the satisfaction of the photographer, and under the influence of the latter's strict injunction to 'sit quiet and still, and put just a little expression into his countenance,' is not usually remarkable either for vivacity or ease. The consequence is, that the most satisfactory portraits are usually those of oldish, hard-worked men, whose habitual cast of countenance is grave and sedate; and the greatest failures are with young people of either sex. This difficulty is no fault of the photographer's. As long as he is obliged by the requirements of his chemicals to bring his sitters up into a glass room, to enforce stillness on them, though only for two or three seconds, and, in short, to subject them to all the depressing influences which are involved in sitting for their pictures, so long he will have difficulty in securing their best expression. But if the rapidity of his processes goes on increasing as rapidly as it has done, there can be little doubt that these hindrances to perfect photographic portraiture will be rapidly removed. The necessity of letting the sitter know the exact moment of exposure is involved in that of making him sit still for two or three seconds. If the picture could be taken instantaneously, and upon a dry plate, which would enable the artist to wait, if need be, for a favourable expression, likenesses would be freed from the half-suffering, half self-conscious look, which steals over sitters who have been formally posed. And an instantaneous dry process is a discovery which the experience of the last few years fully justifies photographers in anticipating. The new magnesium light promises to solve the other difficulty—to dispense with the necessity of a glass studio with all its discomfort for the sitter, and all the temptation to meretricious decoration which it appears to hold out to the photographer. The metal magnesium, the oxide and carbonate of which is a familiar medicine, is itself rare. It will burn like a candle, and it emits a light peculiar for its wonderful richness in chemical rays; but until recently the cost of isolating it has been so great, that its capabilities have never advanced beyond the rank of a chemical curiosity. Recent discoveries have, however, facilitated its manufacture, and it has come into partial use among photographers. A negative of Sir Charles Lyell was taken with it at the recent meeting of the British Association. A slight further reduction in cost will enable photographers to use it for the purpose of taking likenesses in the houses of their sitters; and the sitter's gain in personal comfort will be duly registered in the improved expression of the picture.

Proceedings of Societies.

South London Photographic Society.

The ordinary monthly meeting was held in the City of London College, on the evening of Thursday, Nov. 11th, the Rev. F. F. Statham, M.A., F.G.S., in the chair.

The minutes having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. Peter Mudie, H. F. Clements, and Henry Mertins.

Mr. Wharton Simpson then read an account of some Experiments in Uranium Printing (see p. 541). In the course of read-

ing the paper, Mr. Simpsou handed round examples of the various processes described, observing that they were simply the results of labaratory experiments, not intended for exhibition, but it had occurred to him, when he had, in the absence of any other paper, undertaken to describe these experiments, that the illustrations would make the matter more interesting. One or two of the examples possessed especial interest, as being practically, to all intents and purposes, Wothlytype pictures, although produced before he knew anything whatever of the details of the specifications.

The CHAIRMAN in some complimentary remarks having tendered a vote of thanks to Mr. Simpson,

Mr. PRICE asked in what the Wothlytypo patent consisted, or if any real patent could be claimed in the process.

Mr. SIMPSON said he apprehended that the validity of the patent was scarcely a question for their consideration at present, and in that meeting. He might remark, however, that the combination of nitrate of uranium and nitrate of silver in collodion, probably constituted the basis of the patent.

Mr. H. COOPER, junr., said that until within the last few days, he had made but few experiments in uranium printing, as he was working quite in the dark as to manipulations and formulæ. Since he had obtained the details of the specification, however, he had during the last two days made a good number of experiments. He had found that without the use of some sizing material, the image was in the paper, rather than on the surface. It appered then that some sizing material which would not form an insoluble compound with silver would be necessary. In the specification, albumen was amongst other things recommended; but as that would be coagulated by the salts in the collodion, it would not be suitable. It appeared to him that the two most likely substances were gum arabic and gum tragacanth. He had tried these working with Mr. Simpson's formula, and had found the results in every way satisfactory, but on washing the prints the collodion washed up, and left the paper. This resulted, he presumed, from the use of too much sizing material. He then tried gum arabic again, using a smaller quantity. This printed a beautiful colour; toned to a fine purple in the acetate toning bath in a few seconds, but, on drying, it assnmed the cold tone it now possessed, (Mr. Cooper here handed round an exceeding delicate and brilliant print of a cold steely black tone). Prints sized with gum tragacanth, assumed a fine bistre tint, but the collodion seemed to penetrate the paper in parts. This was perhaps due to the use of two small a portion of sizing material.

Mr. SIMPSON remarked that in the specification especial stress was laid on rubbing in the sizing material, so as to incorporate it to some extent with the paper. This was probably with a view to making it receive the collodion evenly and retain it on the surface.

Mr. COOPER said he had tried rolling after sizing and drying, but the result was scarcely satisfactory. Unless there was plenty of organic matter the print was wanting in vigour, and if too much were used the collodion had a tendency to peel off in washing. Another difficulty was the inequality of the coating, the result of draining, and where the collodion drained so as to give a thicker coating, he found a darker and more vigorous image. He had tried some other processes with uranium. With collodion containing fifty grains of nitrate of uranium he obtained an image of a fine ruby tone, but generally only a bright blue. With silver in the collodion will be found a vigorous negative necessary; with gold a soft negative. He tried the salts in water only instead of collodion. Mr. Cooper called attention to a number of fine specimens he had produced, and mentioned some peculiar difficulties and inconsistencies he had met with in using the same materials; some printing deeply in the printing frame, and toning readily, whilst others remained a pale, sandy brown in the printing frame, and refused to tone at all. He had used a bath of acetic acid, as recommended in the specification, and this he found, as well as toning generally, reduced the depth a little, so that he found considerable over-printing necessary.

Mr. SIMPSON said that it was probable many conditions would require settling before uniform and good results could be obtained with certainty, as the nature and amount of the sizing material seemed seriously to affect the result. He might mention in reference to the blue or grey image produced by gold alone, that having prepared some collodion with a mixture of nitrate of uranium and chloride of gold and obtained a grey poor image, he found that by immersion in a solution of nitrate of silver a rich purple brown was obtained. He handed round the print as example of the result of reversing the usual order; this was a print formed in gold and toned with silver.

MR. COOPER had tried a similar experiment, but without satisfactory results.

A vote of thanks to Mr. Cooper for his interesting remarks and able experiments having been passed,

Mr. HOWARD said that with the exception of the employment of collodion there was not much that was new in uranium printing. Several years ago, the subject attracted much attention, and in the second number of the PHOTOGRAPHIC NEWS, an interesting record, was given of the experiments of M. Molard and of M. Brebisson. The prints were produced by developing the paper prepared with nitrate of uranium in a week solution of silver, and toning them with gold. The prints were found to be too much sunken in the paper; on trying the use of gelatine, an improvement was obtained, but a difficulty was experienced in getting it insoluble to bear washing, &c. These gentlemen found the prints no more durable when tested than ordinary prints. Mr. Draper also experimented at that time, and his experiments would be found in the NEWS. He discovered the importance of organic matter in the process.

Mr. COOPER said he had tried gelatine, which gave a beautiful colour; but the collodion film upon it was tender, and easily removed.

Mr. SIMPSON said that uranium printing was not claimed by any one as new. It must not be forgotten that the discovery was due to Mr. Burnett, whose researches were both interesting and valuable. It happened unfortunately, that the prints exhibited many years ago as the results of uranium printing were not pleasing, and probably had the effect of deterring many from trying the process, rather than of inducing them to adopt it. Mr. Burnett was an experimentalist, and just produced laboratory results without pictorial value. It was in testing the claims of M. Niepce de St. Victor, that the experiments of M.M. Molard and Brebisson were undertaken, and their opinion must be received with some degree of caution, as there seemed to be some antagonistic spirit at work. In testing for permanency, they employed destructive agencies, such as nitric and sulphuric acid, cyanide of potassium, &c. Now it might be very interesting to know the results of these re-agents upon prints, but submitted that they were not legitimate tests of permanency. (A laugh).

Mr. GRANT stated that in 1838 he was engaged with Mr. Mayall, and he remembered that uranium printing was tried, but abandoned again, as unsatisfactory.

Mr. COOPER would suggest discarding silver altogether. It was clear, as Mr. Simpson had pointed out, that if silver were used, some fixing agent would be necessary. He intended to try platinium, and he thought it was probable that it would give good results. He understood from Mr. Taylor that Mr. Burnett preferred palladium.

Mr. TAYLOR said that he liked palladium himself, but Mr. Burnett preferred bichloride of mercury. He regretted that he had not known the subject was to be brought forward, as he could have brought many specimens produced by himself and Mr. Burnett in 1858 and 1859.

In answer to a question on the subject of permanency,

Mr. HUGHES said he thought the best tests were those employed and described by Mr. SIMPSON in his experiments with some Wothlytype pictures, in which he endeavoured to anticipate the effect of time.

Mr. TAYLOR said that Mr. Dawson and himself had made some experiments to test the constitution and probable permanency, a short account of which he would read. They found no essential difference in constitution between the print submitted to their examination and a silver print. "In the first series of experiments, the destructive agents, such as nitric acid, hydrosulphate of ammonia, permanganate of potash, cyanide of potassium, chlorine, &c., were applied simultaneously to the surface of the so-called uranium photograph and to another ordinary one on albumenized paper. The latter was always selected as nearly as possible of the same tone as the former. The result was, that both soon faded, but the ordinary print more quickly than the other. Thinking that this difference was due to the protecting film of collodion or other varnish, we then applied the same agents from the *back* of the paper. We were not mistaken in our surmise, for in this case, the Wothlytypo specimen was in no respect superior to the other. Both, indeed, showed symptons of fading almost simultaneously; but if there was any difference, it was in favour of the albumenized print. Another

series of experiments was gone through, in which, part of the same albumenized photograph was coated with plain collodion and dried. The chemicals were then applied to the surface of each, as in the first experiments. In this—no doubt from the protecting covering being thicker in the one than in the other—the ordinary silver print resisted their action much longer than the other."

Mr. Simpson said that assuming the conclusion just referred to as to the permanence of prints coated with collodion to be borne out, it was a fact of interest and importance. In connection with that subject he might take that occasion of passing round a print produced with chloride of silver in collodion, and toned and fixed in the usual manner. He had before referred to the subject, and would not now enter into it further than to call attention to the specimen.

Mr. Cooper had repeated Mr. Simpson's experiment, and was able to confirm it. He had dissolved 20 grains of nitrate of silver in a few drops of water, and then added the solution to an ounce of collodion containing 5 grains of chloride of magnesium, which decomposed part of the nitrate, leaving a little in excess. This gave fine soft prints, which might be readily removed from the paper, if desired and used in the process of photo-diaphanie, as the image was entirely in the collodion film.

Mr. Blanchard had made some experiments with nitrate of uranium and silver, on plain writing paper. Like some of Mr. Cooper's, they were of a sandy colour in the pressure frame. He tried the application of a solution of iron which quickly gave a black tone, but the whole picture rapidly darkened. This however might probably be obviated, and there might be means of securing a fine tone in that way.

A conversation followed on the solution of nitrate of uranium becoming turbid in daylight, and clear again in darkness, which Mr. Simpson explained was a general characteristic of the salt.

Mr. Davis referring to the same subject said there were several combinations of oxygen with this metal U O: or the protoxide, U_2O, or the sesqui-oxide, and two oxides with different proportions of oxygen, $U_2O_3 + U O$, and $U_2O_3 + 2 UO$. Possibly the changes effected by the action of light produced some of the intermediate conditions.

Mr. Blanchard said in reference to the sizing he should think it possible to make a collodion which would lie on the surface without the use of any sizing material. It was well known to manipulators of pyroxyline, that by employing cold acids they could produce a cotton which would be very thick and have great body with 2 grains per ounce. Such a collodion would probably answer the purpose.

Mr. Jabez Hughes thought there could be no doubt of the truth of the Chairman's remark, that the subject of uranium printing would be again brought under the Society's attention. Judging from the interest evinced in Swan's carbon process, there could be no doubt, now the information was diffused, that the Wothlytype would largely engage photographers' attention. Mr. Hughes continued, "In considering this subject, however, I strongly recommend that the discussion be divided into its three obvious divisions—its historical, its legal, and its photographic aspects. In judging of uranium printing let us remember that, though Wothly's name now comes prominently before us, there were others before him, notably our countryman Mr. Burnett, who were working with the same metal. Let us then assign to each explorer his proper meed of praise, never forgetting, however, that no distinct mode of using uranium has been published, or any series of pictures exhibited, that seriously gave us hopes of its supplanting chloride of silver, until the present Wothlytype. In discussing the second aspect, the legal one, there will probably be a great variety of opinion, many maintaining that there is not novelty enough to sustain a patent. This is a matter on which, as a Society, we can scarcely be called on for an opinion, although, seeing that the patentees give it free to amateurs, and make no very exorbitant charge for professionals, it scarcely comes before us in the usually obnoxious form of patents. Whether the patent be valid or not is of much less importance to us than, the next question; Is the process a good one? Is it an improvement on chloride of silver printing? These are the real points for us to discuss; for be the patent ever so valid, unless the process is an improvement it will not be practised, and if it be such an improvement that amateurs and professionals adopt it, the means of adjusting the interests of all parties concerned will quickly be found. I think it therefore of primary importance not to be led away by considerations of whether this or that person used nitrate of silver and uranium with or without collodion, but rather is the process by which these lovely prints on the table are produced, an improvement on the usual printing process, and can we substitute it for our present practice? I do not wish to oppose the discussion of the historical, or the legal questions; let them be fully examined, and let them lead to what conclusions they may, but pray keep them distinct and so not mix them up with the purely photographic question. I say this much, as I have met with persons who, on the conviction of the patent not being sound, have not hesitated to condemn the process too. Mr. President, any process capable of producing such beautiful results, demands our most serious consideration, apart from all the accidental circumstances by which it may be surrounded. In this respect M. Wothly stands in the same relation as Mr. Swan. We looked with interest on carbon printing, but never had faith in it, until we saw Mr. Swan's pictures; and in like manner, whatever we may have seen and heard of uranium printing, we never had serious thoughts of its disturbing silver printing, until these prints of Wothly's entirely changed our views. It is for us now to try whether it will break down in the attempt to reduce it to our daily wants, or whether, by possessing anything like the advantages claimed, it will form a revolution in photographic printing. I am happy to find that the South London Photographic Society, with its usual energy, is the first to discuss the subject. The information as to what constitutes the Wothlytype process has been known only two or three days, and already we have a short paper on it, with examples; but more remarkable still is the fact that our industrious and enterprising journalist, Mr. Wharton Simpson, has unconsciously hit on the process itself; for in his paper, after detailing many means of producing pictures by the aid of uranium, he concludes by giving one of the most simple and perfect, and this very one is the Wothlytype itself. These experiments were undoubtedly made before the particulars of the specification were known and the discovery is therefore highly creditable. I believe I only express the general feeling of surprise that there is not greater novelty in the process as detailed in the specification. Well, there it is, but of its full value perhaps we can hardly yet judge, still, from the beautiful pictures of Wothly himself; as well as the interesting examples of Mr. Simpson and Mr. Cooper, I think we may fairly assume that the process is a definite mark of photographic progress. I may state that I have had the pleasure of seeing a good deal of printing done by the persons employed by the Association, and the impression derived has been very favourable to the process. Mr. Cooper remarked that he did not secure uniformity in his results, and also that very much over printing was required. These discrepancies I should certainly attribute to Mr. C's want of experience, as they are quite at variance with what I saw in practice. About one part of the process I was much pleased, the length of time the sensitized paper would remain perfect; a picture I saw printed on Nov. 10th the printer assured me he sensitized on the 28th October. Mr. Blanchard made some interesting observations on the preparation of a collodion to give a high glaze to the paper; a collodion of this nature is very much needed to give the necessary brilliancy for small pictures. Much has been said in favour of the permanency of these pictures, and the experiments conducted by Mr. Simpson certainly favour the idea, but if they are only as permanent as the usual silver ones, there are many other points which recommend the process to our notice. Now that the information is diffused, it is for photographers to experiment with it, and convert the general and vague terms of the specification into safe and reliable formulæ. By this means, possibly, the process may be improved, and a more perfect system be adopted than Mr. Wothly himself knows. There is certainly one weak point in the process, namely, the liability, from many causes, of chloride, carbonate, and organic salts of silver being formed in the paper, but the method adopted by Mr. Simpson, by the use of sulphocyanide of ammonium, seems to exactly meet the want, and thus already to improve, as well as simplify, the process. If the improvements thus begin at the very threshold, we certainly have every encouragement to further investigate this very promising, and, perhaps, highly valuable process.

After some further conversation, and the postponement of a paper by Mr. Grant on Fuming Albumenized Paper with Ammonia, it was agreed that the subject of uranium printing should also be resumed at the next meeting.

Mr. How then exhibited some very fine microscopic enlargements by Dr. Maddox, of which Mr. How is publisher.

Mr. SIMPSON also exhibited some fine prints by Mr. Penny, of Cheltenham, from negatives preserved with beer.

The proceedings then terminated.

Correspondence.

WHAT DOES THE WOTHLYTYPE PATENT CLAIM AS A NEW INVENTION? AND, WHAT DOES IT FORBID US TO USE WITHOUT PAYMENT?

DEAR SIR,—Upon reading over the extracts you gave at p. 543, from the specification of the Wothlytypo process, a question arises as to what constitutes the *validity* of a patent. The patentee claims as his invention, firstly, a peculiar preparation of the paper; but the manner of preparing it is so strangely worded as to be almost unintelligible, see p. 543, chapter 1. We are told that, "well made paper, such as is expressly made for photographic use," is taken, and its surface is covered "with one of the well known and simple mediums, such as arrow-root or common starch, albumen, &c. &c." The paper, thus coated, is subjected "to a rubbing process by any material best suited to force the medium into and between the fibres, and lay them in a firm and compact manner, *to produce, when dry*, a smooth surface;" or, the paper is passed "between rollers." The peculiar wording of this chapter 1, and the words I have put in italics, lead to the inference that the paper, when albumenized, is subjected to a rubbing or rolling process, *whilst it is wet*. Now, this is certainly a very great novelty, and, methinks that it is not likely to be adopted by the manufacturers of albumenized paper, whether a chloride be employed or not. Fancy the appearance it must present, after undergoing such a process. If, however, the paper be rolled, *when dry*, it is not a new invention, as your advertisement columns will prove.

In chapter 2, we learn that, "instead of using the ordinary preparation of nitrate of silver," the patentee employs "preparations of another metal in combination;" and this turns out to be "nitrate of uranium." These two nitrates are added to "collodion," and the paper sensitized by it. As far as my own knowledge extends, the two nitrates of silver and uranium have never been employed before, *in conjunction with collodion*, and I therefore presume the patent is valid to that extent, but, *to that extent alone*. We are told that, by "using nitrates of uranium and silver in combination, *a new salt is produced*." Perhaps a double nitrate of silver and uranium can be formed, if these nitrates be *combined* in atomic proportions; but, in the Wothlytype process, they are not used in "combination"—as the patentee words it—but merely *mixed in conjunction*, and then, *not in atomic proportions*. The atomic weight of nitrate of uranium being 252, and nitrate of silver 170, they stand in the relative proportions—to form a double salt—of a small fraction less than one and a half of the former to one of the latter; and, therefore, as the quantity of nitrate of silver in the Wothlytype process is very small indeed, compared with that of the nitrate of uranium, there is a very large excess of the latter beyond what is requisite to form a double salt.

I come now to chapter 3, in which I am more immediately interested. Here we are told that, "instead of dissolving the sensitive salts in collodion,"—viz., the nitrates of silver and uranium—they are dissolved in "alcohol and water," and the paper is sensitized by this aqueous and alcoholic solution. Many months before I published, in your journal, an account of my experiments on the action of various nitrates upon albumenized paper, you may perhaps recollect, that I told you I had mixed each of those nitrates with nitrate of silver, and—when I had time—would furnish you with particulars of the curious results I obtained by using these several mixtures for printing purposes. I have still, standing on a shelf, the bottles containing them, and they have stood there for more than two years. I have used them with chlorided albumenized paper, chlorided non-albumenized paper, and non-chlorided non-albumenized paper. Suppose I now choose to use my mixture of nitrates of uranium and silver—without collodion—and use it for commercial purposes, *does this Wothlytype patent forbid my doing it?* or, am I right in supposing that the patent does not, and cannot, prevent my using the nitrates of uranium and silver, in any way I choose, *provided I do not employ collodion as a vehicle for sensitizing my paper*. If this view of the case be incorrect, allow me to put in a rather extensive claim for priority of use; and to state that, more than two years ago, I used for printing purposes, upon chlorided albumenized paper, chlorided non-albumenized paper, and non-chlorided non-albumenized paper, both *Saxe* and *Rive*, solutions of the following nitrates mixed with solutions of nitrate of silver, with and without the addition of alcohol, viz., nitrates of soda, potash, ammonia, strontia, baryta, cobalt, nickel, copper, zinc, manganese, mercury, bismuth, uranium, and thallium; and moreover, I have not only used these several mixtures by themselves, but also mixed together in various conjunctions too numerous to mention; and I have also used the whole of them together.

Chemists do not usually consider a solution of two separate salts to be a solution of the double salt they would form by chemical combination—*even if they be dissolved in atomic proportions*—for, to be so, the double salt must be crystallized out and re-dissolved. Strictly, and therefore *legally* speaking, a double salt of uranium and silver is neither used nor formed in the Wothlytype process: suppose, therefore, I produce a double nitrate of these metals, and use it with or without the addition of the single nitrate of uranium or of the single nitrate of silver, *would the patent prevent my doing so*—even with collodion? This is a very curious question, and not easily answered; and I leave those who are more learned in patent law than I am myself to solve it.

At present, all I want to know is, Does this patent prevent my using, for commercial purposes, a mixture of nitrates of silver and uranium, *without employing collodion as a vehicle for sensitizing my paper*, notwithstanding I used this mixture more than two years ago? An answer to this question will much oblige, yours truly,— GEORGE PRICE.

18, *Mornington Road, New Cross Road, Deptford.*

[It is no part of our duty to define the points claimed in the Wothlytype patent, nor how far they are validly claimed. We may remark, however, that the really salient claim of the patent appears to be the combination of nitrate of uranium, nitrate of silver, and collodion for printing purposes. The use of nitrate of uranium and nitrate of silver in conjunction is, as you will see from an article in this number, very old. We do not think that albumen will be practically used in the process at all. The "rubbing," referred to in the specification, is to incorporate the sizing material with the texture of the paper, instead of allowing it to rest on the surface.—ED.]

PORTRAITS BY MAGNESIUM WIRE.

SIR,—Having carefully watched the process of taking the photograph of Sir. C. Lyell, at Bath, during Professor Roscoe's lecture, having fortunately a chair whence I could view the same clearly, I bought magnesium wire and brought it home, thinking that the matter was so easy, that in the long winter evenings I could make some good fireside pictures. My first experiment was on a person with marked features, and who could keep quiet; I burnt (in which there was no difficulty) three lengths of the wire, holding them together in an American clip, and with an exposure of about ten seconds (from one to four seconds is my usual time of exposure) the result was, I dazzled myself, and I dazzled my friend, and on developing, nothing at all appeared! Not wishing to put any more fellow creatures to torture, I next experimented on a well marked fossil coral, here the experiment was more successful but not satisfactory. As there was no danger of dazzling the object, I held the wires almost close to it; the result was that I got a photograph of the burning wire, but of my coral not a trace! I did not use the reflectors, merely, as I mentioned above, three bits of wire (of which I enclose a specimen) held in a clip, as the expense of the reflectors is too great to be incurred by an amateur who may perhaps only take a dozen pictures in the winter. Can you, or some of your correspondents, furnish us with a cheap and easy way of taking magnesium portraits? Yours truly, G. W. O.

[The use of a reflector is not absolutely necessary in taking photographs by the aid of the magnesium light, but is very desirable. There are two or three things however to be observed. In the first place you must have a sufficient volume of the light, and sufficiently near the model to illuminate

it properly. In the next place you must carefully screen the lens from the light. And finally, you must use either a white screen to reflect the light on the shadowed side, or burn another piece of wire on that side for a short time, just to illuminate the shadows, and prevent blackness. It is probable that you burnt insufficient wire, and did not take sufficient care to see that it illuminated the model well. Three or four strands of such wire as you enclose twisted together would be desirable to get a good flame.—Ed.]

TAKE CARE OF YOUR LENSES.

Sir,—Let me give a word of caution to my photographic brethren, and advise them to remove the lenses from their studios, if they are at all in exposed situations; and when the duties of the day are over, to see that they are well secured in an iron safe, or any other place thought better, as it is becoming a thing of frequent occurrence to have them stolen. I have fortunately always carried out the precaution I am now recommending, or I should certainly have lost mine the other night, as my glass room was entered by thieves, and everything in it (as well as my yellow and inner room) ransacked in expectation of finding them. My visitors were "well up" in photography, if I may judge by the selection they made; for as they were disturbed before they had quite finished, and left some things behind, after being put together for removal, I had an opportunity of judging by their selection and arrangement that they were familiar with the *art!* (I must mind that I don't have Mr. Dalton down upon me) and knew what was likely to be useful.

If you can spare space for this, and in giving it publicity prevent loss, you will oblige yours truly,

Buchanan Smith.

Blackheath Park.

A SIMPLE LITHOGRAPHIC TRANSFER.

Sir,—I send you two clippings from the *Evening Standard* of Saturday; in respect to the following, will you permit me to append a few questions?

The description of a very rapid progress for reproducing pencil drawings has been going the round of the Russian journals. The process will be particularly useful in campaigns, where it is often desirable to have a number of copies of a hasty pencil sketch. Some time ago M. Villani-Villanis remarked that if a sheet of paper on which a plan or any drawing or writing has been executed with pencil be moistened with acidulated water, and afterwards inked, the pencil marks alone will take the ink, and the whole drawing may then be transferred to metal or stone. Captain Sytenko, of the Russian artillery, director of the photographic service of the staff at St. Petersburgh, has introduced very ingenious modifications into this process, and contrived a portable military press, which, as already hinted, may be extremely useful in campaigns. It does not take more than ten minutes to effect the transfer of the drawing upon a zinc plate or lithographic stone.

1st. Can any of your correspondents throw any light on this process?

2nd. What is the chemical action inferred?

3rd. If the above method is successful, could not lead be used in combination with sensitive salts, instead of carbon or transfer ink, as a means of simplifying the production of a lithographic transfer.—Yours, &c., B. L. Spackman.

P.S.—I may add that I have tried the above *and failed*, though I have good appliances with which I am quite successful in photo-lithographic matters. B. L. S.

[If the writing were effected with a wax crayon or oil crayon, it perhaps might answer; but we see no reason why ordinary pencil marks should repel water and take ink, which to make the lithographic transfer would be necessary.—Ed.]

Photographic Notes and Queries.

Photographic Art Union.

Sir,—If the art claims of photography are such (as I fully think they are) as those set forth in the *Quarterly Review*, and of which you are giving your readers the benefit at the present time, how much more are its claims for an Art Union of its own, as stated a fortnight ago in your pages?

Although I fully admit with J. H. C., that photographs are distributed, in a great many instances, in the various Art Unions, yet may I ask what good does the profession (speaking of a body) derive from them?—Ans. Very little. In having one of its own, I do not doubt but that the profession would be benefited, our exhibitions (photographic) better filled, and the public have a greater chance of getting a prize, and, probably, at a cheaper rate. This, of course, remains to be proved. I am, sir, yours, &c. E. G.

Miscellaneous.

Chrome for Photography.—A chrome green of great beauty is prepared as follows, according to M. Guignet, the French chemist:—Take a mixture of three parts of boracic acid, and one part of bichromate of potash, calcined at a temperature of about 300°, centigrade. An evolution of water and oxygen gas is observed, and there is formed a double borate of sesquioxide of chromium and potash. This salt, which is stable at the ordinary temperature, is decomposed by water, giving biborate of potash, and sesquioxide of chromium. The latter body in the nascent state combines with water, and forms a hydrated sesquioxide of a remarkably fine colour. This is separated from the biborate of potash by decantation and washing, and the remaining chrome green is allowed to dry at the ordinary temperature. The pigment is being largely used among artists, on account of its beauty and brilliancy. The colour is very solid, and it has the valuable property of looking equally beautiful by gas or candle light, as it does by daylight—the green colour not changing to blue, as is the case with many pigments. Sesquioxide of chromium may also be obtained in a very curious form by the decomposition of bichromate of ammonia. A quantity of crystallized chromic acid is dissolved in water, and divided into two equal parts; one portion is then neutralized with ammonia, the other portion added, and the whole evaporated over oil of vitriol. When the solution becomes sufficiently strong, the bichromato of ammonia separates in the form of large cherry-red crystals, which are collected by decantation, drained on bibulous paper, and dried at a gentle heat. On exposing a small portion of this salt to the heat of a spirit lamp, in a platinum dish, a very energetic action takes place, accompanied by strong incandescence, and green bulky masses of chromic oxide shoot out in every direction, exactly resembling ordinary dried green tea leaves. Sesquioxide of chromium possesses another property which renders it of interest to photographers. After it has been ignited it may be considered as being practically unaffected by any chemical reagent. It is, on this account, of the greatest value for colouring paper pulp, from which legal documents are to be made. The green tint of the paper renders them incapable of being copied photographically, whilst the unalterability of the sesquioxide of chromium prevents the paper from being bleached by chemical means before taking the photograph. There is only one objection to paper tinted in this manner. The oxide of chromium is so intensely hard that it rapidly wears away the pens employed for writing on paper tinted with it.

To Remove Silver Stains.—In the *Photographischer Archiver*, M. Obernetter recommends a concentrated solution of perchloride of iron as a detergent for silver stains on the hands or clothes. If gallic or pyrogallic acid has been used, it will be necessary to wash the spot afterwards with a few drops of a strong solution of oxalic acid. A weak solution of this salt is also useful for diminishing the intensity of negatives to be copied in the solar camera. Weak negatives may be transformed into strong ones by using first a solution of chloride of iron, and secondly with pyrogallic acid and nitrate of silver.

Talk in the Studio.

Christmas Greetings and Photography.—We have been favoured by Messrs. Pumphrey of Birmingham with examples of four complimentary cards, intended for Christmas and New-Year's gifts. The cards are intended as a suitable mounting for the Medallion Photographic Portraits, and the idea is well

carried out. A medallion photograph of the donor is to be placed in the centre of the card, where it is surrounded by a design and border of holly leaves and berries, mistletoe, &c. The words of greeting in various forms, wishing "merry christmas," "happy new-year," "compliments of the season," &c., surround the figure in red and gold. Some of the examples forwarded are very pleasing. This application of the photographic portrait is a happy and seasonable idea. We understand that the designs are registered, and the trade arrangements for photographs will be found in our advertisement columns.

NAUDIN'S PORTFOLIO.—This is another essay to carry out an excellent idea, which has often been attempted but not hitherto well managed. "Naudin's Portfolio" is to be a monthly series of the portraits of notable men and women, with brief memoirs of each, edited by Hamilton Hume. The present attempt promises well, but leaves much room for improvement in execution. It contains a view of the residence of Charles Dickens at Gad's Hill, with a group on the lawn, in which Mr. Dickens and several members of his family, Wilkie Collins, Alston Collins, Mr. Fechter and some others, may be recognised. A subject of this kind is difficult to manage, but it is not managed so well as might have been. A portion of the house forms the chief object, the figures, some of which are blurred from movement, looking diminutive and insignificant beside the house, which looms heavily and clumsily in the back ground. To make such a picture at all artistically effective, the group should have been brought considerably further from the house, and the figures made a little larger, the whole of the building in much smaller proportions, lighter and less definite from the effect of distance and atmosphere, would then have been obtained, forming really an appropriate background, instead of a black, heavy, unpicturesque mass of bricks. In addition to this are four card portraits, consisting of Mr. Tom Taylor, B. Webster, Cap. Blakely, and Mrs. Wood. In these, the portraiture is sufficiently good, and we readily recognise the likenesses, but there is room for improvement as examples of photographic art. They are very neatly mounted on India paper, and a terse, cleverly written biography, just covering a space the size of the portrait, accompanies each.

EXHIBITION OF PHOTOGRAPHIC SOCIETY OF SCOTLAND.—This exhibition is announced to open in the middle of December. Photographs for exhibition to be delivered at 90, George Street, Edinburgh, before the end of the present month. Silver medals to be awarded for The Best View, taken by a dry process; the details of the process to be communicated to the Society:—The Best View, taken by an Amateur, by any process:—The Best View in Scotland, taken by any process:—The Best Group:—The Best Portrait.

PHOTOGRAPHS ON A DEAD EYE AGAIN.—The *Gazetta del Popolo* of Florence relates a curious instance of the certainty with which a murderer may be detected by taking a photograph of the victim's eye after death. A woman named Spagnuoli having been murdered at Florence a few days ago, the prefect of police, who had already caused two men to be arrested on suspicion, resolved to try the above experiment, and had the eyes of the dead body photographed. The photographs obtained being duly enlarged, the whole of the right cheek and the lower part of the face of one of the men in custody were discovered accurately depicted on the interior membrane of the eye. The resemblance is said to be so strong, as to preclude all possibility of doubt.

To Correspondents.

A. G.—About five feet opaque over head, and the same, or a foot less, at the sides.

A CONSTANT READER.—We have met with markings of a somewhat similar character on dry plates, from various causes. The use of hard water for the first washing will cause a deposit of insoluble salts of silver on the surface, which sometimes assumes the irregular wave-like markings on your print. Another cause, giving irregular wave-like markings is change of temperature, whilst the plate is drying. Sometimes the opening of a door is sufficient to cause a draught or a change of temperature, which will issue in these marks of irregular drying. The marks are not peculiar to the tannin process, but may occur with any kind of dry plates.

MILDEWED LENS.—If gentle rubbing with a moist cloth do not remove the stains on your lens, try a little dilute sulphuric acid, one part of the acid in four parts of water. If this fail to remove the stain, you may conclude that some actual decomposition of the surface of the glass has taken place. Some samples of foreign flint glass are very liable to this injury if not carefully kept dry. It is probable, however, that no serious damage may be done to the lens by the presence of the stain, beyond obstructing a very small portion of light. 2. We have no practical knowledge of the lens you name; but we should agree with you in fancying that it professes too much. This letter was overlooked last week.

URANIUM NIT.—We can scarcely give a list of all the photographic journals in the world in this column, still less indicate those which we prefer. There are four or more in France; two or three in Germany; two in Spain; one in Italy; one in Belgium; one in Canada; three in America; one or two in India. The only one which gives a photograph regularly every number, is the *Philadelphia Photographer*, a very excellent journal ably conducted, beautifully printed, and containing in every number a fine photograph. The price is 30 cents, or 1s. 3d. stirling. It is published monthly in Philadelphia. 2. You will find the fullest information yet published on the Wothlytype process in our own pages. It can scarcely be expected that the Association can trouble to supply amateurs with instructions when they make no charge for permitting them to use the process.

JOHN LLOYD.—We do not think the manufacturer you name the best maker of landscape lenses. 2. We prefer stereo pictures taken with a bi-lens camera. 3. We have tried samples of all the collodions you name, and found them all good; perhaps we should give the preference to No. 3. 4. We have never used the lens to which you refer, and do not know its capabilities. We should prefer a triple to a double lens for landscape work.

T. KING.—We shall see, when the Wothlytype process has been more fully tried, how far it is likely to supersede silver printing. At present, it promises well, and so far as our experiments have gone, we are pleased with it; but it is only extensive experience which will decide how far it is free from the troubles of silver printing. 2. In the cases to which you refer we publish the information as fully as it reaches us. About 50 or 60 grains of nitrate of uranium in an ounce of collodion. The proportion of acetic acid is stated in the specification. Mr. Cooper has used one part in thirty of water with advantage. We have used more. 3. Thanks for your other letter; but as the eccentric correspondent was a lady, we will spare her your strictures.

G. W. R.—The best enlarging lens is the No. 1 triple, but a good portrait lens will answer. A soft negative full of detail is best, but by management in manipulation, any kind of negative which is good and sharp will do.

PROTO-IRON.—It is possible, from your further description, that the fault is in your collodion, and that it is really over-iodized. Try diluting it with plain collodion, or, in the absence of that, with alcohol and ether in equal portions.

ST. DENIS.—In the list you give, we should prefer No. 7.

O. K. WALKER.—We will endeavour to examine the bath, &c., forwarded, and let you know the result next week.

A CHEMIST.—The only alteration we would suggest in your plan for your glass-house, is the further extension of side light, which might encroach four or five feet into the lower portion, where the camera will be placed. White sheet glass is best, but not cheapest, and it soon deteriorates; so that, on the whole, the common crown is best.

J. B.—The PHOTOGRAPHIC NEWS, No. 245, contained Mr. England's paper on "Recovering Silver from Residues."

J. B., No. 2.—It is important that the water employed in making a negative bath should be pure distilled water. If that be not readily procurable from some chemist in your neighbourhood, use common water, and after making your bath, render it quite neutral with carbonate of soda, and allow the solution to stand for a few hours in the sun, which will blacken and throw down any impure matter present. This may then be filtered out, and after the bulk is made slightly acid, it will be fit for use.

AN ARDENT STUDENT OF THE NEWS.—Photographs entered at Stationers' Hall are protected in this country and in such other countries as we have copyright relations with. There is no international copyright existing between England and the United States, and consequently registration here is no protection against piracy there. Our publisher will register any number you may require at 1s. 3d. each. The fee at the office is 1s.

C. D. O.—In order to obtain transparent positives by printing on dry plates from a negative, which show well by reflected light, when backed up with white varnish, requires considerable skill. The best results would probably be obtained on albumen plates, but unless you are familiar with it the process is somewhat difficult. Perhaps the tannin process will be the next best. Take care to use vigorous negatives, not to over-expose, and to use plenty of acid in the developer. In order to obtain the black colour by reflected light, first treat the finished image with a solution of bichloride of mercury, about six grains to the ounce, and afterwards washing with a dilute solution of hyposulphite of soda, about two grains to the ounce. This will convert the deposit into an intense black, which, if managed rightly, will give a good positive when backed by plaister of paris or white paper.

X. C. Z.—Direct printing on albumenized paper by the ordinary solar camera generally requires at least an hour's exposure with good sunlight. The manipulations of exciting toning, fixing, &c. are the same as in ordinary printing.

B. L. F.—Nitrate of uranium is sold at the present time at about 2s. or 2s. 6d. per ounce. If it be found that the supply of the raw material is plentiful, it will doubtless be sold lower if it come into common use.

Several correspondents in our next.

"Photographs of Indian Objects for the New Zealand Exhibition," "Fixing Uranium Prints," &c., and some other articles are compelled to stand over until our next.

Photographs Registered during the Past Week.

MR. EDWIN PEARSON, 2, Lansdown Street, Worcester,
Photograph—Copy of an Autograph Letter written by the celebrated Dr. Jenner.

MR. A. GOODCHILD, Redcar,
Two Photographs of Rev. J. Postlethwaite.

MESSRS. W. AND D. DOWNEY, 9, Eldon Square, Newcastle-on-Tyne,
Two Photographs of the Rev. Berkley Addison.

MR. JOSEPH BOYN, 24, St. Vincent Crescent, Glasgow,
Portrait of Rev. Thomas Slater, late Minister of St. George's-in-the-Fields, Glasgow.

MR. F. TATHAM, 17, Manbey Grove, Manbey Park, Stratford, E.,
Photograph (from a Drawing by Frederick Tatham) of the late Rev. Edward Irving.

MR. ROBERT BONING, Hastings,
Five Photographs of "East Sussex Fox Hounds."

THE PHOTOGRAPHIC NEWS.

Vol. VIII. No. 325.—*November* 25, 1864.

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FIXING ARGENTO-URANIC PRINTS.

Further experiment confirms us in the conviction, based at first on theoretical considerations, that argento-uranic prints must be submitted to some fixing process. Wherever silver enters into a printing process on paper, no matter in what infinitesimal proportions, there is a possibility that chloride or other insoluble salts of silver may be formed. This possibility destroys all confidence in the stability of the prints, if they have not been submitted to the action of some agent which will remove these silver salts. It is doubtful whether the nitrate would be eliminated without very long and repeated washings; and it is certain that even if it were, mere washing in water would not remove the traces of chloride, and organic compounds of silver, which are formed when nitrate of silver comes into contact with paper. Therefore, all argento-uranic prints, whether by the Wothlytype or other cognate processes, must be fixed, if they are intended to be permanent.

In every instance in which we have submitted such prints, which have been merely washed, to the simplest tests, the presence of silver has been revealed; hydrosulphate of ammonia has produced an immediate stain. On enquiry as to the history of the Wothlytype print upon which our experiments were made a few weeks ago, we learn that it had been fixed with sulpho-cyanide of ammonium. We feel it important to repeat this, because in our first description of the operations in the Wothlytype process, we stated, as we were then informed, that a simple washing with water and a sponge, was necessary for finishing the toned print, and we should be sorry for any of our readers to retain the impression that a print so treated, would resist the reagents we applied in our testing experiments. On this subject of testing permanency, we may here make another remark. In the report of some experiments for the same purpose undertaken by a contemporary, an extract from which was read at the last meeting of the South London Society, by Mr. Taylor, it is remarked that:

> In the first series of experiments, the destructive agents, such as nitric acid, hydrosulphate of ammonia, permanganate of potash, cyanide of potassium, chlorine, &c., were applied simultaneously to the surface of the so-called uranium photograph, and to another ordinary one on albumenized paper. The latter was always selected as nearly as possible of the same tone as the former. The result was, that both soon faded, but the ordinary print more quickly than the other. Thinking that this difference was due to the protecting film of collodion or other varnish, we then applied the same agents from the *back* of the paper. We were not mistaken in our surmise, for in this case, the Wothlytype specimen was in no respect superior to the other. Both, indeed, showed symptoms of fading almost simultaneously; but if there was any difference, it was in favour of the albumenized print. Another series of experiments was gone through, in which part of the same albumenized photograph was coated with plain collodion and dried. The chemicals were then applied to the surface of each, as in the first experiments. In this—no doubt from the protecting covering being thicker in the one than in the other—the ordinary silver print resisted their action much longer than the other.

Of course, we know nothing of the character of the print submitted to the tests in question; but, assuming that it was like that submitted to our experiments—a well-fixed picture—a discrepancy occurs, which, as it involves a point of photographic science, more important to photographers than of the value of personal observation, we feel sure our contemporary will assist, by an explanation, to set at rest. The question we should like answered is this:—Did the whites of the uranium print become yellow and discoloured when hydrosulphate of ammonia was applied, either at the back or the front of the print, as those of an albumenized silver print become in all cases, when treated with the same reagent? In our experience, prints in which collodion is the vehicle containing the salts, whether chloride of silver, or nitrate of silver and nitrate of uranium, do not, after properly fixing and washing show any such discolouration. Should this experience not be confirmed by further practice, and in varied conditions, we shall be disappointed in one of the sources to which we look for permanency.

We have, during the last few weeks made many experiments in fixing prints produced by uranium and silver, which lead us to believe that a very weak fixing bath of sulpho-cyanide of ammonium will give stability to the pictures. Hyposulphite of soda we wish to discard. Ammonia, besides being unpleasant from its fumes, we do not find satisfactory, as prints, apparently well fixed by its aid, showed unmistakeable traces of silver in the whites, when submitted to the hydrosulphite of ammonia test. We have, after various experiments, found the following solution give good results:—

Sulphocyanide of ammonium	...	...	1 oz.
Distilled water	...	...	8 „
Chloride of gold	...	...	2 grains.

Prints submitted for ten minutes to this bath acquire a fine purple or black tone, and are fixed at the same time. They should, on removal from this bath, be simply sponged, using a very small quantity of water, and then washed in a few changes of water, for an hour or two, or less. The bath may be used over and over for some time. There are certain conditions desirable to be observed, which, together with the detail of some experiments as to the best strength, we shall refer to in our next.

COPYRIGHT IN PHOTOGRAPHIC PORTRAITS.

The decision in the Sheriff's Court, by Mr. Commissioner Kerr, in the case of "Maull and Another v. Gass," to which we adverted last week, is not rendered more satisfactory by a perusal of the judgment, with a copy of which we have

been favoured by Messrs. Maull and Polyblank. The points raised by the judge may, however, be more instructive than they are satisfactory, as they may serve to indicate the shoals and rocks upon which it is easy to wreck all the protection the Copyright Act is intended to give to the artist. The various points raised by the defendant are left undecided, the point upon which the non-suit was based being one raised by the judge himself, involving a somewhat delicate question of law and fact. It appears that Messrs. Polyblank take four portraits on one plate, using a bi-lens camera, taking two pictures at once, and using a repeating back to get other two exactly the same. These four portraits were all in one position, and virtually the same, but it is clear that between the right-hand picture and the left-hand picture on the plate, there is a slight difference, just as there is between the two halves of a stereoscopic picture. This point the Commissioner elicited in court from Mr. Fox, Messrs. Maull and Polyblank's manager, and remarked at the time to that gentleman, that, as the view obtained by the right eye and the left, separately, were different, in like manner the portraits produced by two lenses, side by side, were different. As Messrs. Maull and Polyblank regarded the four as being practically the same portrait, they only registered one, and upon this point the decision is based. The Commissioner assumes that the pirated portrait may have been one of those not registered, and that this possibility set aside the claim of the plaintiffs. On this point, however, notwithstanding its ingenuity, we conceive that the plaintiff did not receive justice.

The Commissioner having raised the point to which we have referred, did not ask Mr. Fox if he was prepared to swear that the piracy was a copy of the print which was registered. It is quite possible that the piracies were actually copies of the print which was registered, and that the witness might have been prepared to prove it. The decision was therefore clearly given on an *assumption*, to the effect that no such proof was possible. The hint which photographers will deduce from this point is very clear. Whenever it is important to preserve a copyright in any picture, a print from every negative must be registered, and no print must by any chance be issued from a negative which is not registered.

Some of the objections of the defendant's solicitor are also suggestive of dangers to be avoided. We pass by his statement that the sitter is really the *author* of a portrait, as sheer nonsense; but his objection against the registration is better based, and is an objection which would, we fear, be held good against a great number of the registrations which are entered. The Act requires that the "name and place of abode" of the proprietor of the copyright, and the author of the work, shall be duly entered at Stationers' Hall. The plaintiffs in this case simply entered the name of the firm and place of business. "Maull and Polyblank" is held not to be a name in law, nor the address of the business establishment equivalent to "the place of abode." The name in full of each member of the firm should be given, and the actual place of residence and abode. The negligence we occasionally observe in regard to particulars of this kind in the descriptions forwarded to our publisher with photographs to be registered, convinces us that many registrations would be found valueless from causes of this kind, should they ever be examined in a court of law.

The judge holds that the statute by which a copyright is conferred being penal in its enactments, it must be very strictly construed, and this kind of construction in its very nature generally tends in favour of the person who would be subject to the penalties. We now append a copy of the judgment of Mr. Commissioner Kerr, for the better information of all concerned.

MAULL AND POLYBLANK *v.* GASS.

This was an action for damages alleged to be sustained by the plaintiffs, by reason of the defendant having infringed their copyright of a photographic portrait of the Duke of Cambridge.

The facts were very simple. The plaintiffs applied to His Royal Highness to sit for his portrait, and the Duke did so. Two negatives were taken by the same instrument at the same time, and from both of them positives were printed off.

The positives thus printed off, would be, and are to all appearance, precisely the same. The difference between the negatives being what may be termed mathematical only. *One* portrait only was registered at Stationers' Hall, as it was said under the statute 25 and 26 Vic., c. 68, in the name of Maull and Polyblank. Copies of the Duke's portrait, and evidently piracies were purchased at the shop of the defendant, but it was not, and possibly could not, be proved from *which of the two portraits of the Duke*, the negatives used by the persons from whom the defendant purchased the printed copies were taken. The Duke's permission to publish, and no doubt sell for their profit copies of his portrait, was obtained by the plaintiffs; indeed, His Royal Highness himself bought a hundred copies. The jury assessed the damages contingently at £10, the questions which were raised for the defendant being reserved for further consideration. The plaintiffs relied on the statute before referred to (section 1) as giving them a title to sue, and contended that they, being the "author" of the photograph, had complied in all respects with the provisions of section 4 of the Act.

The defendant first contended on the other hand, that the plaintiffs were not the "author" of the photograph, but only the agents of the Duke, in taking his portrait by a particular process, and that assuming His Royal Highness to be the author, there was no agreement in writing, or assignment of the property or right to publish to the pictures. It is fortunately not necessary that I should at present attempt to interpret the first action of the statute on which the question arises.

The defendant also contended that there was not sufficient registration, objecting that neither the "names" of the publishers nor their "place of abode" was given. "Maull and Polyblank" being no name in law, and the address on the register at Stationers' Hall being their place of "business," and not of "abode." This question it is also unnecessary to determine.

It was further contended that the action was brought under section 6, and not under section 11, of the statute, the latter applying only to actions in superior courts, by which process could be awarded to compel the delivering up to the plaintiff of piracies; and that there was no evidence of *scienter*, as required by section 6. This question it is, fortunately, also unnecessary to determine. For the defendant finally contended that, assuming the plaintiffs to be the "author," and the registration to be sufficient, *one* portrait only had been registered, while there were *two* negatives; and the plaintiffs had failed to show that the piracies of which they complained were taken from a negative obtained from the *registered portrait*.

This objection appears to me to be fatal to the plaintiffs' claim. The statute on which the plaintiffs rely being penal must be strictly construed. It gives to the author of a photograph a *copyright* (a kind of property quite unknown to the common law), and a right to sue for the infringement thereof, *provided certain conditions are complied with*. Unless these conditions are fully complied with, the property does not come into existence, and there can be no right of action. Whether, however, the plaintiffs are the "author" or the portrait has been properly registered, I am not called upon to decide; at present, the plaintiffs may or may not have a copyright in the registered portrait; I give no opinion either way. All I at present decide is, that assuming the plaintiffs to be the "author," and the portrait to be properly registered, the plaintiffs have failed to show that the alleged piracy was from the registered portrait. It is not enough in an action for infringement of copyright to show that the piracy complained of is substantially a piracy; it is essential to prove that it is an *actual infringement* of the plaintiffs' right.

On an application made subsequently, it was ordered that the plaintiffs be nonsuited.

We again take occasion to urge upon photographers the importance of a united effort in the coming Parliamentary session, to secure in the promised Consolidated Copyright Act such clearly stated rights and remedies as may, if possible, preserve their property from the loss, and the art from the degradation, which attend piracy.

PHOTOGRAPHS IN THE NEW ZEALAND EXHIBITION, 1865.

We have been much gratified by an examination of the classified list of contributions from British India and its dependencies, forwarded by order of the Secretary of State for India, to this exhibition from the Indian Museum, London, a copy of which we have been forwarded by Mr. J. Forbes Watson, M.A., &c. Passing by an interesting list

of specimens of Indian produce and Indian manufacture, our attention is claimed by Class XIV., "Photographic Apparatus and Photography," where we find an extraordinary and interesting list of photographs of various articles of Indian art, workmanship, and native manufacture, and characteristic native photographs. These photographs have been very ably executed by Mr. William Griggs of the Indian Museum. The Indian authorities are initiating an application of photography in every way praiseworthy. By its aid they are giving to manufacturers in this country the various forms and patterns which are most approved by the natives of India. "Sheffield, for instance," as Mr. Griggs remarks "can now have the various forms of agricultural implements which the natives prefer to those made for European use, indeed a large trade is now being developed. The inventive mind of the native also supplies the textile manufacturers of Lancashire and Scotland, with many beautiful designs for cotton prints, shawls, &c. for English use, as well as supplying the natives with the patterns of their own choice." In addition to this application we understand that 50,000 photographs, reproductions of native portraiture, are now being prepared for distribution to various museums and educational societies, for the purpose of disseminating a correct knowledge of the tribes and casts of India. A large collection of the same photographs will, we believe, be forwarded to the Dublin International Exhibition. We are glad to record this praiseworthy activity on the part of the Indian Government in a valuable and interesting application of photography to a purpose for which it is so well adapted.

A CHAPTER OF HINTS.

In our varied intercourse with photographers, personally or by correspondence, as well as in our own experience, we frequently derive hints and suggestions from observation or communication, which, whilst apparently trivial in themselves, are worth treasuring as materially aiding in the convenient and successful practice of photography, amateur or professional.

We subjoin a column or two of such collectanea :—

Cleaning and Polishing the Steel Plates of Rolling Machines.—It is most important to keep the steel plates of rolling presses thoroughly cleaned and polished. If they are not kept clean, they spoil more prints than they improve; if they are not kept polished, they fail in giving to prints the fine surface desirable. To secure a clean and polished surface, keep a solution of whiting in turpentine ready for use. Apply it with one linen rag and polish clean with another. This mixture readily removes grease and dirt, and keeps a fine polish on the plate. When the plate is only occasionally, it should be kept covered with bees' wax dissolved in ether or benzole. This will prevent rust, and can be easily removed with the mixture first described.

A mixture of camphor and hog's lard, half a drachm of the former to two ounces of the latter, dissolved together by means of heat, with a little powdered black-lead added, is said to remove spots of rust readily. It should be applied hot to the place, left on for a day or two, and then wiped off rust as well.

Negative Varnish.—We do not usually counsel photographers to make their own varnish, knowing, from experience, the difficulties frequently encountered in the attempt. The following recipe was recently communicated by a photographer of considerable experience, and described as very excellent, being clear and hard, and not becoming tacky when heated by the sun :—

Take—

White shellac	... 240 grains
Gum sandrach	... 240 ,,
Oil of lavender	... 4 drachms
Alcohol, sp. gr. 830 ...	... 10 ounces.

Dissolve with gentle heat, leave to subside, and then decant; or, if required quickly for use, filter.

Iron and Gallic Acid Developer.—The same gentleman stated that he had, for many years, used no other developer than the following, a modification of a formula published some years ago in this journal :—

Protosulphate of iron	1 ounce
Gallic acid...	... 40 grains
Nitric acid...	... 10 minims
Water	... 10 ounces.

Dissolve and filter. The solution, if well stoppered, keeps well.

Mackarel Marks on Dry Plates.—A correspondent says he has found the use of hard water in washing dry plates a prolific source of mottled films, with irregular density, like mackarel markings.

Covered Dishes.—We noticed recently, on visiting the studio of a clever amateur, an excellent contrivance in regard to flat dishes for the silver solution for paper, the toning solution, &c. Each dish was fitted into a shallow deal box, with a close-fitting lid dropping over it. By keeping the lid closed when the dish was not in use, dust was effectually excluded, and evaporation, to a large extent, checked. There was no necessity to pour the solution each time when done using it into a bottle, and thus not only was much time saved, and convenience secured, but much waste, in the shape of drainings, prevented. Altogether, the arrangement is one worth imitating.

Glass-Tipped Forceps.—The Rev. William Law recently showed us a very simple and convenient contrivance which had some advantages over the horn forceps used for lifting paper from the silver bath. It consisted, primarily, of a strip of gutta-percha, six or eight inches long and one inch wide, doubled in the middle by the aid of heat, and, in the inside of the bend, a small solid piece of gutta-percha cemented to give firmness to the bend. Two strips of glass were then provided, each of about four inches long, and a little less than an inch wide, rounded and smoothed at their points on a grindstone. On each side of each strip, close by the other end, a slight curved portion was ground away by the grindstone, something in this fashion ⋍ the edges of the curve being levelled. Into the ends of the bent piece of gutta-percha these strips of glass were then fastened; the gutta-percha being made soft and plastic with hot water, was bent round the edges of the pieces of glass, so as to grip the curved portion described. It will readily be seen that when the gutta-percha was cooled and set, the curved indenture of the edge of the glass would prevent any slipping. The completed instrument looks something like a pair of sugar-tongs with glass shanks and a gutta-percha bend to secure elasticity.

Tiles for the Flooring of Glass Rooms.—Where a glass room is built in a garden, the use of red clay tiles for the flooring will be found a great improvement upon planks of timber for a variety of reasons. In the first place, there will be no elasticity, and, consequently, no vibration, a point of great importance. In the next place, there will be much less tendency to dust, a point of not less importance. Good square red tiles, laid flat by being imbedded in concrete, moreover look neat, even when uncovered. Where it is desired to secure a more ornamental effect, this is easily done by using the ornamental tiles or a tessellated pavement. To remove the sensation or suggestion of coldness, a piece of thick carpet may be used to cover the portions used by the sitter.

Clean Fingers.—One of the simplest modes of keeping the hands clean whilst developing is as follows: procure a piece of mackintosh cloth about twelve or sixteen inches square, and laying it over the hand, use it to grasp the negative, as you would a hot plate with a napkin. The thickness of the cloth between the finger and thumb will not prevent a perfect hold of the glass plate, and the hand being thus covered, the solution which flows off the plate at times, and

which would stain the hand, is conducted away by the grooves formed by the folds of the cloth, into the sink. After a little practice, this method causes no inconvenience, and effectually preserves clean hands.

Nitric Acid in the Developer.—An increase of temperature often brings a slight tendency to fog, even when everything is in good condition. In such case it will be found that a trace of nitric acid added to the iron developer, about a drop in three or four ounces of solution will, generally be sufficient—entirely removes the tendency, giving beautifully clean shadows, without in any degree reducing the density of the lights. We refer of course to the use of bromo-iodized collodion in such case.

Curtains in Glass Rooms.—A great deal of trouble in suspending and arranging curtains in glass rooms will be saved by photographers if they procure a contrivance called "Edwards' patent self-attaching curtain hook." It consists of a piece of brass wire bent into the form of something like an S, but considerably elongated, and with the point of the lower limb sharp, and pressed, so as to touch the portion it is bent up against; such a contrivance is easily made where it cannot be procured. The sharp point is pushed through the hem of the curtain, and the other limb is hung over a piece of wire stretched tight upon which the curtain is suspended. The hooks slip readily along the wire to draw or withdraw the curtain, which in this way can be put up in a few minutes by any one, without the trouble of sewing on rings.

BUNSEN AND ROSCOE'S PHOTO-CHEMICAL RESEARCHES.

It may be known to many of our readers that Professor Bunsen and Dr. H. E. Roscoe have, for many years, been engaged in a series of photo-chemical researches, and that they have arrived at a satisfactory system of photometrical record, based on the use of plain paper prepared with chloride of silver. We have recently been favoured, by Dr. Roscoe, with the complete report of their researches, presented to the Royal Society. As the experiments upon which the system of photo-measurement has been based, besides their scientific interest, possess much suggestion of practical value in connection with photographic printing, we shall lay some extracts before our readers. After referring to their former researches and to the importance of ascertaining the nature and extent of photo-chemical action on the earth's surface, as affected by season and latitude, the report proceeds:—

The proposals which have been made to register and measure the chemical action of light by help of photographic tints have been very numerous; amongst others, we may mention those of Jordan Hunt, Herschel,* and Claudet.† All instruments based upon such principles must, however, afford totally unreliable results, unless we know the conditions under which photographic surfaces of a constant degree of sensitiveness can be prepared, and unless the relations are determined which exist between the degree of tint produced and the time and the intensity of the light acting to produce such a tint.

Hence one of the first points of inquiry is, to determine whether the tints produced by the photographic action vary in shade in the direct ratios of the intensities of the incident light.

For the purpose of measuring the degree of tint which the paper assumed, we employed a circular disc with black and white sectors, whose relation to one another could be altered at pleasure. By allowing the black sector to cover 1-10th, 2-10ths, 3-10ths, &c., of the surface of the disc, we obtained, on rotation, a disc having the tints 1-10th, 2-10ths, 3-10ths, &c. The central portions of the disc were filled with the papers which had been tinted by the action of the light. It was soon found that very slight differences in the degree of shade could be detected so long as the tints are light coloured, but that when deeper tints are employed the eye loses the power of estimating such differences. Experiments thus made proved that the shade produced upon photographic paper is not proportional to the intensity of the incident light; thus the intensities 5 and 1 were found to correspond to the shades 0·5 and 0·22. Hence we have altogether relinquished the idea of employing any mode of measurement founded upon a comparison of photographic papers of *different* shades.

We next had to examine whether *equal* shades of blackness produced by light of different intensities acting for different times can be used as the basis of the mode of measurement, under the supposition that equal shades of blackness always correspond to equal products of the intensity of the incident light into the times of insolation. The truth of this proposition, which was assumed some years ago by Malaguti,* has recently been experimentally verified by Hankel† within the slight variation of intensity from 1 to 2½.

In order to determine this, a very ingenious mechanical arrangement was contrived to measure the times of insulation to within small fractions of a second, and a series of experiments undertaken, which issued in the following result:—

As the intensity of the light in these experiments varied from one to nearly fifty, without a greater deviation from the calculated results occurring, than that which may fairly be ascribed to the unavoidable experimental errors, we conclude—

That equal products of the intensity of the light into the time of insolation correspond, within very wide limits, to equal shades of darkness produced on chloride of silver paper of uniform sensitiveness.

Upon this important proposition a method may be founded for measuring the chemical action of light by means of simple observations. For, if we assume as the unit of photo-chemical action that intensity of light which produces in the unit of time a given degree of shade, we have only to determine on a strip of paper, blackened in the pendulum apparatus, the point where the shade of the strip coincides with the given unalterable tint. The reciprocals of the times which correspond to these points of equal shade, give the intensity of the light expressed in terms of the above unit.

It is clear that this method is available only under the suppositions,

1. That the phenomena of induction, accompanying the light of the intensities employed in the measurement of the total daylight, are of so short a duration, that the variations thus produced fall within the limits of the necessary experimental errors.

2. That it is possible to prepare a photographic surface possessing a perfectly constant degree of sensitiveness.

3. That an unchangeable shade of blackness is obtainable, which can be easily prepared, and can be exactly compared to a photographically tinted paper.

After a further series of experiments, from which they conclude "that photo-chemical induction does not exert any prejudicial effect with intensities of light, such as are employed in the measurements under consideration," they proceed as follows:—

The next question upon which the successful solution of our problem materially depends, concerns the possibility of preparing a photographic paper which shall always possess the same degree of sensitiveness. In describing this portion of our investigation, we have thought it necessary to enter more minutely into the experimental details than perhaps may be consistent with the reader's patience, because we felt that, unless a complete description of the experiments were given, it would be impossible to remove the most weighty objection which can be urged against photometric measurements based upon a comparison of photographic shades.

It appeared most rational to avoid all complicated photographic receipts for the preparation of our sensitive surface, and we therefore limited our investigation to the case of a simple paper covered with a film of pure chloride of silver.

For the purpose of comparing the sensitiveness of papers prepared in various ways and under varying conditions, we employed a strip of paper which had been photographically shaded in the pendulum-photometer, and afterwards fixed in a bath

* *Phil. Trans*, 1840, p. 46.

† *London, Dublin, and Edinburgh Philosophical Magazine*, Ser. 3, vol. xxxiii. p. 329.

* Ann. de Chim. et de Phys. tom. lxii. p. 5.

† "Messungen über die Absorption der chemischen Strahlen des Sonnenlichts," Abhandl. d. Kön. Sächs. Gesellschaft der Wissenschaften. Leipsig, 1862, Bd. ix. p. 55.

of hyposulphite of soda. The strip exhibited a gradually increasing shade, from its white to its dark end, and was furnished with an arbitrary scale, so that the particular shade corresponding to a given number could easily, at any time, be read off by the soda flame.

In order to test whether any given papers possessed an equal degree of sensitiveness, they were exposed for equal lengths of time to the same light, and then, by means of the arrangement for the purpose, they were examined, to see whether they exhibited the same degree of shade; that is, whether they corresponded to the same number on the scale adapted to the fixed strip.

We always employed a solution of chemically pure crystallized nitrate of silver as the silvering liquid. The pure chloride of sodium required for obtaining a film of chloride of silver was prepared by passing gaseous hydrochloric acid into a concentrated solution of common salt, washing the precipitated chloride of sodium with water, and heating it strongly in a platinum basin.

We have made a series of experiments for the purpose of determining the influence exerted on the sensitiveness of the paper by the concentration of the solution of salt, the quantity of silver contained in the silvering solution, the quality of paper used, and the changes of atmospheric temperature and moisture.

(*To be continued.*)

EARLY EXPERIMENTS AND SUGGESTIONS IN URANIUM PRINTING.*

In 1858, Mr. Harry Draper suggested the use of nitrate of uranium and nitrate of silver together, giving the following formula:

Nitrate of uranium	... ...	100 grains
,, silver	... ...	10 ,,
Water	... ...	1 ounce.

This gave fine prints of a bistre tint. About the same time, Mr. Sutton, in the *Photographic Notes*, described some fine uranium prints on albumenized paper, which had been forwarded to him without any details. He made the following suggestions on the subject:—

Albumenize a sheet of paper in the usual way, omitting the salt. Hang it up to dry. Float the back of it on boiling water, as recommended by M. Laborde, for the purpose of coagulating the albumen, dry it again, and put it by for use when required. When you wish to print, float it upon, or immerse it in a strong solution of nitrate of uranium and dry it in the dark. Expose it in the pressure frame for about the same time as an ordinary print, and develop the picture by immersing it in a twenty-grain bath of nitrate of silver, which may be used a great number of times. This brings out the picture in all its details, and as it will appear when finished. Then wash it well in cold water, and lastly in boiling water, and immerse it in a very weak bath of bromide of potassium, in order to decompose any free nitrate of silver that may remain combined with the liquine of the paper, and convert it into insensitive bromide of silver, the yellow tint of which would not be perceived. Then wash again to remove the bromide and the print is finished. The bromide fixing bath may be used a great number of times, and it would not redden the print so much as ammonia, which, after all, is not a fixing agent, for the ammoniacal oxide and chloride of silver are sensitive to light.

We may here remark that in our experiments with albumenized paper and nitrate of uranium the paper was very insensitive, and the permanency would be more than doubtful, as the insoluble compound of silver and albumen would necessarily be formed if that metal were used. In the *Cosmos* about the same time M. Godefroy described some modifications which were alleged to shorten the exposure very materially. He describes the process as follows:—

Place a sheet of paper upon a solution holding nitrate of uranium and nitrate of silver. In proportion with the amount of nitrate of uranium the sensitiveness is increased. The following formula will answer well:—

Water	... ...	14 drachms
Nitrate of Silver	... ...	1 drachm
Nitrate of Uranium	... ...	2 ozs.

* Continued from p. 556.

The paper is to be flowed for two or three minutes and then be dried. It may be exposed either in a camera or under a negative, and the impression is to be developed by immersion in the following solution, viz.:—

Water	... ...	1 oz.
Photosulphate of Iron	... ...	40 grains
Tartaric Acid	... ...	20 ,,
Sulphuric Acid	... ...	5 minims.

The image is rapidly developed and can be fixed by soaking in rain water.

The results were as follows:—

First, Exposure under a Negative.—In a well lighted room with diffused light, at about four feet from the window. No. 1.—Five seconds exposure: the image perfectly visible and of a greyish black tone. No. 2.—Ten seconds exposure: image vigorous, tone almost black. No. 4.—Fifteen to twenty seconds of exposure: the image very strong, tint like that of an engraving.

Second, With the Light from Clouds.—Thirty seconds exposure: the tints of the paper changed in the parts affected by light; the image is visible in the camera, on the iron bath a uniform tint is in general obtained.

Third, With Sunshine.—The action is much more rapid: at the end of a few seconds the tint changes, and various tones can be produced by variations of the process.

Fourth, Before a small-sized Moderator Lamp.—If the pressure-frame touch the glass shade of the lamp, ten minutes' exposure will produce the tint of No. 2, but if the frame be withdrawn to a distance about twenty inches from the lamp, an hour's exposure will be required to produce a similar result.

M. O. Hagen, also published some details for shortening the exposure as follows:—

The author has succeeded in increasing the sensitiveness of this paper considerably, so that intense positive pictures may be obtained upon ordinary writing paper in thirty, or at the utmost, sixty seconds of exposure, and upon bibulous paper even in fifteen seconds. The sensitiveness is obtained by introducing some small change in Niepce's process. In the first place, the fibres of the paper to be employed, must be freed as much as possible by separating them from the size. This is effected by laying the paper in boiling water, and boiling it for some time. The paper is then taken out, pressed between blotting paper, and laid, while still damp, upon the solution of nitrate of uranium. It is advisable not to dry the paper completely before doing this, as otherwise, any size that may be present, attaches itself again to the fibres, and impedes the contact of the salt with them. Care must also be taken that the uranium salt employed contains no free nitric acid; for the more free acid it contains, the less sensitive is the paper soaked in it, and the redder are the pictures produced. Niepce states that a solution of uranium salt is obtained by dissolving oxide of uranium in nitric acid. In this he has probably not taken into consideration the free acid.

The other matters intermixed with commercial oxide of uranium, such as copper and arsenic, also diminish its sensitiveness, and injure the tone of the picture. These metals, therefore, must be removed by sulphuretted hydrogen.

Lastly, pictures of much greater intensity are obtained when a little alcohol or ether is added to the aqueous solution of the silver salt. This addition is very important, as the time of exposure may be considerably shortened thereby. By observing these conditions greyish black pictures are obtained, whilst Niepce produced them of a brownish red tint.

In the Society's Journal for June 1859, Mr. Burnett published the following details of uranium processes:—

The following is a good formula for a platinum toned uranium print:—

Sensitize with		
Nitrate of uranium	... ...	100 to 150 grains
Water	... ...	1 ounce.
Develop with		
Nitrate of silver	... ...	30 grains
Water	... ...	1 ounce.

or the same converted into an ammonia-nitrate bath. Wash, after development, first with plain water, and then with water slightly acidulated with bitartrate of potash (i. e. cream of tartar) or citric acid.

To prepare the toning bath, take common bichloride of platinum one eighth of an ounce (value about 3d.) dissolve it in a quarter of an ounce of water, and make and drop into it a saturated or pretty strong solution of acetate, tartrate, or formiate of potash, as long as any precipitate continues to be thrown down. Let it subside thoroughly, and pour off the clear liquid which may be neutralized with carbonate of ammonia or potash, and then used for making up the toning bath, first as common gold chloride is, or with the further addition, *in the bath*, of enough carbonate of soda or ammonia, to render it strongly alkaline, (heating if you please, to

favour the formation of platinate or plutinate of soda). Or another, and I think *better* plan of securing the advantages of the presence of tartaric or any other vegetable acid is this:—First, precipitate with *sulphate* or nitrate of potash, so as to get a solution of *sulphate* or nitrate of platinum, which will keep without change for any length of time, and then add to it the *tartrate of ammonia* or of potash or formiate of soda, or oxalate of ammonia, *just when* you are going to use it, and only to the quantity you are going to use in making up your toning bath, which bath, as the others, may be made either simply neutral, or else strongly alkaline, as is wished, and may be also used without or with a previous heating to promote protoxidation of the platinum. The same toning bath formula is equally applicable for the platinum toning of ordinary prints.

For printing by the neutral-tint uranotype, the following is a very good formula:—Steep the paper in, or float (if albumenized) on

Nitrate of Uranium	200-250 grains.
Water	1 oz.

Expose till the impression is distinct, even in details, though faint, then wash well with the aid of a sponge or flannel covered roller till the paper is clear and the uranic salt dissolved out of the lights. This *is not at all a tedious* washing, much less so than the ink processes, and may be performed sufficiently well in a very few* minutes, even on thick paper.

N.B.—The first water in which the print is put should be preserved for the recovery of the uranium by evaporation or by precipitation by an alkali or alkaline carbonate; and the rest of the washing may be either in successive baths or a stream of water, dabbing well with the sponge or rolling with the roller. Develop with

Red Prussiate of Potash	20 grains.
Water	1 oz.

Washing well again with the sponge to get rid of red prussiate. *This* washing must be very careful or the lights would be blue after toning. I have used and recommended a little citric acid or bitartrate of potash in one of these latter waters, in order to get rid of the precipitated yellow uranic oxide or uranate of potash, though it is not necessary for that, if we use the larger quantity named in the toning bath, still it is to be recommended as aiding in the quick removal of the red prussiate. The toning bath consists of

Sulphate of Iron	¼ to ½ grain.
Citric Acid	½ „ 5 grains
Water	1 oz.

Finally, wash in water, and dry. This process is capable of giving according to time in the toning bath, almost any desirable depth or variety of tone, which is obtained by silver, and is apparently (as far as facility and quickness of the washing, and the results obtainable, and the ease with which they are attainable), one of the best of the processes without silver, which have yet been published.† It must be particularly noted that the action of the toning bath must be attentively watched, and the print removed from it *very considerably before* the attainment of the ultimate tone, or degree of blackness desired; otherwise, it will be found to have been materially overtoned when dry, possibly turned quite blue, if left even two or three minutes too long.‡

As variations in uranium printing, we may use a proportionably strong solution of the acid or oxalate of uranium formed by dissolving uranic oxide, or better, precipitated neutral uranic oxalate, in a solution of oxalic acid. The iron may also be introduced at the commencement of the sensitizing in the shape of a few drops, more or less (but more than when used in toning is borne), of ferric-nitrato solution, or ferric-ammonia oxalate or acid ferric solution; or these latter salts, or iron, alum, or other ferric salt may be made to replace the ferrous sulphate in the toning bath just given. I have tried also cobalt, nickel, and gold, silver platinum, copper, and various other metals, not only in combination with the uranium, but also in toning baths; but in general, without such success as to induce me to bring them forward prominently here.*

I have in my older papers called attention to the fact, that the uranium process (with both ferrid-cyanide, and the metallic developments) work perfectly well on *albumen* or *glass*, as well as on albumenized paper.

I need hardly give a separate formula for use in negatives taken on albumenized plates, as the management is so nearly alike.†

On collodion plates—owing no doubt to the absence of *readily* oxidizable organic matter—the action is *desperately tedious*, unless we make use of the ammonia oxalate or acid oxalate solution, or of certain other salts, instead of the nitrate; but this paper being on *printing*, we must leave negative processes for another occasion. I should have mentioned that the washing out before development, may be, of course, practised equally in the case of the silver developments (and with possibly, at least to some extent, an advantage, in not letting so much uranium mix with our developing solution, though, when we use an ammonia-nitrate developer, it is mostly precipitated on the paper) as well as with the gold and palladium developments.

In our first volume will be found some further interesting details of the experiments of M. M. H. de Molard and Brebisson in 1858; but it is unnecessary to quote them here.

THE BEHAVIOUR OF IODIDE OF SILVER IN THE SILVER BATH.

BY DR. HERMANN VOGEL.‡

Restoration of an Old Negative Bath.

Negative baths, as already mentioned in the first part of this paper, soon become useless by the repletion of iodide of silver, which in sensitizing will often be precipitated and cause muddiness, or what is still worse, produce holes in the collodion film.

According to the fact that iodine of silver is precipitated by diluting the bath, in some manuals of photography it is proposed to restore the old baths by diluting them to double the volume, in order to separate the iodide of silver by precipitation and filtration, and evaporating the clear fluid to the original quantity.

The assertion that bromide of silver is precipitated together with iodide, is a mistake; for bromide of silver is not to be found at all in the silver bath, not even after it has been added to it before, the bromide not being dissolved in a diluted solution of nitrate of silver. Adding bromide to the silver-bath therefore is useless.

This proposed proceeding of restoring silver-baths will not always be successful, a fact which every one who has tried it, will have discovered.

At first the volume of water added is not sufficient to precipitate the greater part of the iodide of silver; for that a treble dilution at the least is necessary. By this plan the iodide remaining in the solution is reduced to a minimum, which quantity it is necessary to leave in the bath.

But if the iodide must be precipitated to make use of the silver produced by evaporating, for the printing process, the bath is to be diluted fourfold.

After precipitating, let it settle, draw off the clear fluid with a syphon, and evaporate it to about the first volume, or rather until the bath is shown by the argentometer to have the desired concentration.

By evaporating the superfluous water, and a great deal of volatile substances, alcohol, ether, and acetic acid are driven out, alchohol and ether almost completely, acetic acid in a less degree. The bath so evaporated will prove to be acid, especially when it contained at first free nitric acid. If this

* I am, however, not sure but that water which has been boiled or heated to expel the air has some advantages in not peroxidizing the image so quickly; and the addition of a few drops of alcohol or wood spirit might be also useful in preventing peroxidation; these prints, after washing, become alternately deoxidized and peroxidized in the light and dark, changing colour.

† Though in rapidity of printing it falls considerably short of some of the chromic processes, particularly when they have the advantage of the presence of oxalic acid or oxalates, or other vegetable acid, of which I have recommended the addition to them. As to facts connected with permanence I can only refer to prints of March 1850, as exhibited in the Suffolk Street exhibition, now or lately open. Alkalies and their carbonates certainly destroy them at once; but as they may be kept out of contact with them, this becomes rather a convenience to the printer than anything else, as enabling him or her to keep the hands clean without cyanide of potassium, or anything more formidable than ordinary soap and water.

‡ It is to prevent this, and diminish risk of inequality of toning, that I recommend *so very weak* an iron bath. The great preventative of unequal toning is, however, equal washing, or *all parts of the paper* being reduced to *an equal degree of penetrability* to fluids; and it is for this reason I prefer the roller, giving *equal* pressure, as it does, to the *whole* print, to any other assistant in washing.

* We may also get brown or black prints by sensitizing our papers with a mixture of ferrid-cyanide of potassium and uranic tartrate, or nitrate, forming afterwards with iron, or even introducing the iron in the sensitizing of the paper.

† Only, of course, using a *strong* solution, sensitizing by immersion or dipping, and in the case of *silver*, palladium, and *gold* developments calling in the aid of a weak iron bath, so as to make a shorter exposure in the camera answer, or an acidulated solution of gallic acid, tannic, and pyrogallic acid may be used.

‡ Continued from p. 427.

reaction proves rather strong, neutralize your bath by scraped chalk.

The bath so neutralized is to be tried; sometimes it works well, and may be used like a fresh bath. *but sometimes it will give but weak, flat, and solarised negatives.*

The cause of this defect is derived from the non-volatile, organic substances, still present in the bath. It is a fact commonly known that some kinds of collodion will, in process of time, undergo singular variations. There are formed peculiar products of decomposition, the nature of which is not yet sufficiently studied, but which are known to act as reducing substances, and, brought into the bath, give occasion to the above-mentioned faults.

These substances may partly be removed by "sunning" the bath, for by the action of light they will soon be decomposed. The organic matter reduces a part of the nitrate of silver, and precipitates the metallic silver as a black-grey powder. But even this proceeding will not always be sufficient to remove completely the above-named impurities. These will not be completely destroyed, but become more oxidized, and that the less perfectly, the weaker the sunlight was. There is but one sure remedy to completely destroy the organic matter, evaporating the baths to dryness, and melting the salt.

This evaporation is considered by photographers to be disagreeable work, which is owing to the most imperfect arrangements for that purpose found in the photographic studios.

The best way to proceed is to use a dish of the best porcelain, and to warm it, filled with the fluid, over a common burner gas-lamp. The solution will then evaporate without violent boiling and spattering, and the photographer has but to look after it every half hour and fill up the dish, if necessary. In this way the evaporating will interfere but little with the other operations of the photographer. When the solution has come to the point of saturation it is covered with a convenient funnel and evaporated to dryness; afterwards the heat is strengthened and the salt melted. Organic substances, happening in it, will become black by separated metallic silver, and in this case the melted salt after cooling, is to be dissolved again in the necessary volume of warm water, and some drops of nitric acid are to be added. The whole is then to be warmed, which will make the solution in a short time clear and bright. It must now be evaporated and melted again with the above-mentioned precaution, and the nitrate of silver won by this proceeding will be free from all organic substances.

Another precaution is to be observed. You will soon find that every paper in the room, where the evaporation is made, is covered with little brown spots of silver, when brought into the light. This will happen even when the dish was covered from the beginning by a funnel, and it seems that not a spattering but a real *volatilizing* of the silver particles take place. I have sometimes evaporated silver-baths in a *covered dish*, placed in an evaporating room on the outside of the window, when the latter was only opened sufficiently to let the gas-tube pass, notwithstanding this, all papers in the room, which was of 20 feet length, were stained with silver spots, even papers in the adjoining room were affected though the door was carefully shut.

This manner of spattering will not take place until the fluid has passed its point of saturation, and become paste-like.

The vaporating should be undertaken in the most distant place from the room where you keep your prints.

ASTRONOMICAL PHOTOGRAPHY.

In a remarkable *Memoire* presented to the *Académie des Sciences*, M. Faye endeavours to point out the errors which the system of observation hitherto employed produces in the astronomical determination of the hour. The learned author of this work, relying upon experiment, shows that the only means of avoiding these errors is by having recourse to electric telegraphy and photography. The following is extracted from this interesting memoir.

"The possibility of dispensing with the observer has been fully shown at Paris, for some years past, by the experiments made by M. Porro, atmy suggestion, in his ateliers, with the assistance of M. M. H. Robert, Digney Freres, and Quinet. The process, which is extremely simple when operating with the sun, becomes more delicate, but not impracticable, when applied to the stars. It consists in substituting a photographic plate for the eye of the observer, and to register electrically the instant when the light is admitted into the camera applied to the meridian telescope. We have thus obtained ten observations of the sun in twenty seconds. When I say we have obtained, it would be more correct to say that we thought of making an impromptu astronomer of a boy, who was simply charged with drawing a shutter and moving a spring, a task which might have been performed by a machine. If astronomers who have already separately adopted these two powerful means of observation, conclude, as I hope they will, by adopting the still more powerful combination, I desire that the *Académie* may be reminded that I had the honour of presenting to it some five or six years ago, the first effectual observation of an eclipse completely registered by means of this combination of electricity and photography, and the first meridian observation of the sun independent of the senses and the human brain. *

"While examining recently the negative of this curious observation, which I have carefully preserved, I remarked certain defects which I had not noticed before. And upon examining it more closely, I recognized that these defects were inherent, not in the proof, but in the sun itself; they are, in fact, solar spots which have described themselves at the same time as the edges of the disc to which the attention of the observer must be directed. Here, then, is an automatic observation which gives with great exactness, not only the situation of the orb at the moment of the true southing, but also that of its spots, the study of which has assumed so great an importance of late years. Here, then, is a fresh example of the superiority of automatic observation over the old method based upon our senses; as a general rule, we see only those things which interest us at the moment of observation; the rest almost always escapes preengaged attention. Automatic observation, on the contrary, registers everything, what we seek now, and what we look for afterwards.

"It has been objected that the complication this system will introduce into the daily practice of our observatories, will provoke much opposition; to this I reply, that we must pay the same price for every increase of precision in the celestial measurements, for an observatory of the nineteenth century, differs even more from the early observatories, than the machinery of our mills, differs from the old spinning wheel. We shall make fewer observations, but these few will be more reliable. A recent instance has shown to astronomers how unsafe it is to boast of apparent exactness. It is well established now a days that the distance of the earth from the sun, accepted till recently by all astronomers as a definite datum, included an error of more than one thirtieth of its value. We must expect other mistakes of this kind so long as we allow causes of error to exist in the domain of observation, which escape all analysis, like the physiological cause which I now introduce to the notice of the *Académie*."

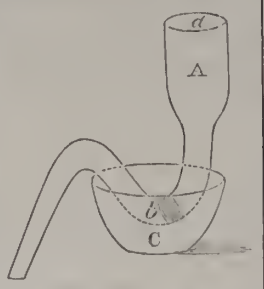
FILTERING GELATINE SOLUTIONS.

As solutions of gelatine are much in use amongst photographers at present in the enamelling processes, &c., and the filtering such solutions when of any great density, being accomplished (generally) with some amount of trouble, per-

* By this I mean negatives obtained upon a large scale, with the indications necessary to refer the measures to the celestial circles.

haps the following description of a simple instrument for effecting the purpose rapidly may be of use to many of your readers. It may probably be an old thing to some, but at all events I have never seen it published or heard of its being used. It is a modification of a similar piece of apparatus suggested by Mr. Crookes, in his Collodio-Albumen process, published some two or three years ago.

The accompanying sketch will, perhaps, serve to explain it much better than writing, or at least assist to do so.



A is a glass tube made and bent in the form shown, into the bend of which at *b*, a small piece of fine sponge is lightly plugged.

C is either a common bowl or any other suitable vessel, filled with hot water, which serves to keep the gelatine in a liquid state whilst being filtered, and may or may not be placed over a spirit or gas lamp whilst in use, according to the amount of liquid to be filtered.

On placing the bend *b* of the instrument in the hot water, and pouring in the gelatine solution at the point *d*, it passes through the sponge at *b*, being filtered in its progress; and as soon as the second bend in the tube becomes filled, and the liquid flows down the remaining part, it immediately acts as a syphon, and the liquid passes over at a rapid rate.

Should you consider this of any value, perhaps you will give it insertion in the News, and if acceptable to yourself and readers I shall be pleased to communicate at a future time one or two other things, which may probably be of interest to some of your readers.

In the mean time, allow me to remain, sir, yours very truly,

N. H.

NEGATIVES IN THE EYE.—GHOSTS!

BY PROFESSOR TOWLER.*

The present article will be limited to facts such as we ourselves have partly discovered and partly collected. An explanation of those facts on reliable rational grounds we are unable at present to give, because the experiments have hitherto been too small in number, and their conclusions too vague.

In all works on opties, the subject of the retention of an image of the retina of the eye invariably claims some attention, but even here this attention is limited to the simple discussion of the fact, without even venturing to elicit a rationale of it. Philosophical toys are constructed by which the retention of the picture is manifested.

In the present condition of our knowledge on this subject we are unable to define the exact time required for the reception of an image, as well as that of the retention or duration of an image when once received.

That a certain appreciable time is required for the reception of the picture of an object is manifest, because when moving with great velocity, as on a railroad, the eye cannot distinguish the contours of near objects; and it is only when the velocity of motion either of the eye or the object has been diminished, that the outline and surface form a recognizable impression on the retina. The velocity and other conditions that affect this impression are not as yet accurately defined.

The same may be said also of the retention of the impression. Various conditions, undoubtedly, combine or conduce to modify the amount of time; of this we are convinced by actual experiments.

Furthermore, the physical structure of the eye, the use and adaptability of this structure, the connection between the physical and the nervous or vital part, are all imperfectly known, so that, as we have just remarked, it is quite impossible to explain rationally the peculiar phenomena we are about to lay before our readers.

Experiment No. 1.

Stain a square of glass in any convenient window of a *green* colour, and insert a small *black* star or cross in the middle. Now direct the eyes upon this star, and keep them fixed upon it, (without the slightest deviation or cessation) for a number of seconds (from thirty to sixty). Close the eyes thoroughly. What do you behold?

The green square is *red*, the black star is *white*, the window frame is *white*, but the panes all *black* or *dark*.

Experiment No 2.

Let the square be stained *red*, and the rest remain as before.

What do you see now, when the eyes are closed and all light is excluded?

I now see a *green* square instead of the red, but all the rest remains the same.

If the square be stained blue, successively of different shades, we shall observe with closed eyes, after regarding the object as before directed, a square in different shades of *yellow* and *orange*.

(N.B—That species of blue-stained glass which produces an *orange* coloured, or *reddish-yellow* coloured impression on the retina when the eyes are closed, is the most appropriate glass for ascertaining the position of the actinic focus of a lens, as also for the skylight and side-light in the glass-house. In like manner the *reddish-yellow* coloured glass, which thus reproduces the same blue, is best adapted for non-actinic lights in the developing room, as also for the printing of vignettes. This is a curious coincidence.)

By thus experimenting with differently coloured squares of glass, the colours that are denominated their complementaries invariably are retained on the retina of the eye, and become visible when the eyes are *closed*.

Experiment No. 3.

A most interesting phenomenon presents itself if we view one of the stained windows looking upon the altar of a Catholic or Episcopal church. Such windows generally are decorated with a variety of figures and objects in the richest colours. Select some prominent object in one of these windows, and some distinct and prominent point, as the eye of St. John, or of our Saviour blessing little children, etc.; look fixedly upon this point for a minute; now close the eyes.

The result will be, firstly, all the colours will be reversed or complementary of the real colours in the pictures depicted on the windows; secondly, after a while the figures will gradually appear well defined and distinct, and then gradually fade away again. It sometimes happens that the figures, after their disappearance, may be reproduced by simply compressing the eyelids; and frequently they will appear after the eyes have been opened and then closed again.

These experiments are performed by means of transmitted light. We now proceed to show how the same results are successfully produced by means of reflected light.

Experiment No. 4.

Incline the head on one side so that the eyes are perpendicular, one over the other, and in this position look intensely upon a point in one of the coloured windows of a church, etc, as above referred to; after regarding this for a minute or so close the eyes, and then raise the head to its natural position. The window will soon be seen in a horizontal position, not vertical, which shows that the impression is in the eye itself, and independent now of the original, and so much so indeed, that, if the head be inclined on the opposite side until one eye is again perpendicular over the other, the church window, etc., will appear upside down.

We are inclined to think that all these impressions on the

* From *Humphrey's Journal*.

retina are smaller than the pictures seen with the open eyes In this, however, we may be deceived.

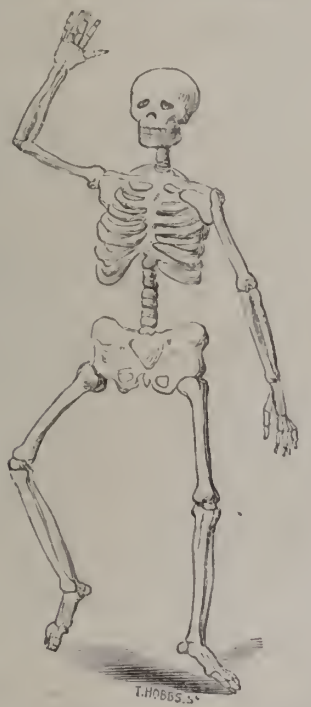
Experiment No. 5.

Paint a small square on a white ground, as on the leaf of a book, of any colour whatever, only let the colour be very carefully filled in, uniform and definite of its kind; paint also a small star or asterisk of a black colour in the middle. Now regard this star fixedly for a minute as before directed, and then close the eyes thoroughly. In this case, as before, the colours that now appear will be complementary of the real colours observed by the open eyes.

In both cases, that is, in the experiments with either transmitted or reflected light, the presence of several colours on the same view mutually reacts upon each other, as becomes manifest in the modification of the complementary colours in the reproductions.

Experiment No. 6.—GHOSTS.

Draw a skeleton, for instance, or a picture of his Satanic Majesty (as he is supposed by the simple laiety to exist



when he prowls among the sons of men) *black* on a white ground, or *white* on a black ground. Look intently on the last vertebra just above the pelvis in the one case, or at the barb at the extremity of the Infernal Emperor's caudal appendage, commonly termed his tail; continue retarding this point intently and without deviation, until the figure begins to flicker or grow dimmer from thus staring. The experiment succeeds best if the sun is made to shine directly upon the paper, or the latter be brilliantly illumined by means of a powerful gas-light. Let the eyes be now closed, or let the light be completely extinguished; in either case the result is the same. The picture gradually starts out well defined and complete in all its parts, but the reverse or complementary of the original as regards colour; thus black will be white and white black. In fact, the reproduction on the retina is a negative of the original picture on the paper. It is very curious to watch the gradual appearance of the ghost becoming more and more distinct, and then as gradually fading away again: and this phenomenon naturally inspires awe if the experiment be performed in a darkened room, for then the observer is apt to suppose that the picture he beholds is located in the dark space before him. The picture, however, is an impression in or on the retina, similar to the actinic impression on the sensitised collodion film, and developed by the nervous filaments, and thus made visible in the sensorium even in the absence of light.

From our experience in photogenic action we find, or are inclined to find, great analogy between this phenomenon in the retina of the eye and the actinic action on the sensitized film on glass; white, for instance, acts with great energy on the latter (at least we suppose so from the energetic manner in which the picture is developed when the reducing agent is brought to bear upon it); the film where light from a white object has impinged, is rendered opaque, dark coloured, or black on the application of the developer; whilst that part of the film which has received the light from a black or dark coloured object remains transparent after developing and fixing, is, in fine, white, as we are apt to denominate it. So in the retina of the eye we behold the same negative effect of dark colour the reproduction of white, and white or transparency the reproduction of dark colour or black.

As we said at the beginning, we are totally unable to explain this wonderful phenomenon at present, and equally unable to give a *satisfactory* rationale of the reproduction of complementary colours in the retina. To say, or assume that the eye decomposes coloured light, absorbs one part of the constituents, and reflects the remaining parts, is indeed nothing more than an assertion or assumption without any proper foundation, resembling many of our fine-spun speculative theories about the cause of colours, in which we may justly say, there is displayed more ingenuity than wisdom.

Our readers will easily descry, from the foregoing exposition of these new facts, that all knowledge has not yet been disclosed, that there is still a wide field of unexplored material for the philosophical pioneer, and that, in fine, in the midst of light we are still in darkness. God is great, and wonderfully grand are the works of his handicraft!

Proceedings of Societies.

MARSEILLES PHOTOGRAPHIC SOCIETY.

This society resumed its sittings on the 4th inst. The subject of uranium printing occupied a considerable portion of the business of the meeting, during which, the Secretary read an interesting paper by M. Liesegang, on the photographic sensitiveness of some combinations of iron and uranium. The secretary, M. Vidal, undertook to verify before the next meeting, some of the principal experiments indicated by M. Liesegang. He dwelt strongly upon the interest presented by the attempts made to obtain direct positive proofs with compounds of uranium, those especially which may be obtained at once in their proper colour under the influence of the sun, without its being necessary to have recourse to a subsequent development.

The Secretary presented some enlarged pictures taken from positives obtained direct; they were received by the members with a degree of enthusiasm which proved that there exists among photographers a certain discouragement with regard to the perfectability of enlarged photographs. The name of the artist could not be divulged, on account of his being one of the exhibitors at the approaching competition. M. Vidal also presented some specimens of enlarged pictures taken by himself, which are very remarkable, and excited in the highest degree the attention of the members of the society. M. Vidal, in support of his communication, produced the original negative, and expressed his gratification at seeing one of the most important questions in photographic art satisfactorily resolved. He had succeeded in obtaining with a degree of perfection equal to that of a direct proof, the projection of a plane at nine metres distance, forming a picture two metres (eighty inches) square. There was not the slightest distortion in the lines, the right angles were perfectly maintained, and the general sharpness was also such as had been obtained by direct reproduction by means of a single lens with long focus.

A discussion ensued on the advantages to be derived from the employment of the *eye-shaped* lens, invented by MM.

Gase and Charconnet, with a request that M. Rigout would place one of these objectives at the disposal of the society, and make, in conjunction with M. Vidal, a series of comparative experiments.

Messrs. Schaffnaer and Co., having sent some specimens of their albumenized paper to the society, the secretary communicated the results of the experiments that had been made upon it; they were favourable, and proved that great care had been exercised in its manufacture. Unfortunately, it is but too true, that their papers, like those of other manufacturers, presented cases of inferiority, which it would be desirable to see disappear from this important manufacture. The society believed it to be its duty on this occasion, to express the wish that processes of constant manufacture should be studied until photography is supplied with paper always satisfactory.

M. Meynier expressed a desire that efforts be made to render the relations between the members of the society more frequent and interesting. He believed that if monthly or bi-monthly excursions, according to the season, were organized, that there would result from these labours in common, frequently repeated, more zeal and emulation, and consequently, more important photographic undertakings. The suggestion was well received.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 23rd Nov., 1864.

Our Photographic Society resumed its meetings on the 4th instant, after a vacation of three months.

On this occasion, M. Aimé Girard presented to the society his translation of Major Russell's treatise on the *Tannin Process*, upon which he made the following remarks:—

"This second edition differs entirely from the first; the subjects treated being doubled in number. Major Russell has passed successively in review the various methods proposed with the view of perfecting the tannin process: some he rejects, others he adopts, adding his own remarks, and combining the whole into a remarkable photographic essay.

"The tannin process, such as it was described in the first edition, is now completely modified. Major Russell still considers the preliminary coating of gelatine or caoutchouc useful; but he carefully points out by what processes operators, who object to employing these preliminary coatings, may dispense with them. The formulæ for the preparation of the collodion are entirely different from what they were formerly: the employment of bromides in large quantity—the employment even of bromides alone—permits of the obtaining surprising results; but it is especially to the description of the methods of development that Major Russell has bestowed the minutest care. After explaining the ordinary method of development with citric and pyrogallic acids, he shows in what the advantages of alkaline developers consist; and he describes, with the fullest details, the method to be followed in developing with carbonate of ammonia; he strongly insists upon the modifications which the really artistic photographer must make in the composition of the developing solutions, according to the character he wishes to give to the negative. These considerations are not the least interesting portion of this treatise.

"Major Russell concludes this new edition by a profound study of the most recent modifications proposed in the tannin process, and shows, with remarkable impartiality, the advantages and objections in each.

"The tannin process is now almost exclusively employed in England, for landscapes; it is beginning to become popular in France, and we hope to see it soon enjoy the same favour in our country. It is a convenient and very sure process, the manipulation of which presents no difficulty when the operator is well imbued with the general spirit which attaches so clearly to the minute and detailed descriptions of Major Russell."

The following letter, from Mr. Warren De La Rue to the secretary, was read:—"Sir,—A few days ago I had the pleasure of receiving the letter in which you inform me that the *Société Française de Photographie* has awarded me the high distinction of a medal, in recognition of the services I have been so fortunate as to render to a special branch of the important science of which it is the mission of your society to promote the progress. I beg you to convey to the committee and to the society the expression of the high esteem in which I hold this mark of approbation bestowed upon my labours, and to say to them that I look upon it as an incentive to pursue the study of astronomical photography with fresh zeal."

M. Michel Schwecjzer, addresses a communication respecting the advantages to be derived from the employment of white screens for lighting models. To make these advantages fully understood, this communication was accompanied by an interesting series of proofs, all of the same bust, lightly tinted yellow, some taken in an ordinary light, others in the same light modified by the employment of white screens, arranged as reflectors, opposite, and on the sides of the model. M. Schwecjzer remarks that not only the value of the shadows, the model, and the general effect are modified by the employment of screens, but that the time of exposure is considerably diminished.

Upon this communication the President (M. Regnault), remarked that he thought that reflectors might render service in the lighting of models, but on condition of being employed with judgment. He believed that with a reflecting surface of cylindrical form surrounding the model the best results might be obtained.

M. Gabriel Blaise presented to the Society two large carbon positives, obtained by M. Poitevin's process, modified by M. Fargier, accompanied by the following letter:—

"I have selected as a present to the Society a proof of large dimensions, representing the staircase of the *Château de Blois*. I have obtained proofs in different colours, one especially is with a fine engraver's black, and with more softness and transparency in the shades than with indian ink, but I have often failed when employing some of the blacks met with in commerce. There are many difficulties connected with this subject which I have endeavoured to remove, for, with portraits, the tint of india ink is not so agreeable as for architectural subjects, for it resembles too much in the public eye, the hue of badly toned and fading pictures.

"During several months past, I have made many experiments in photography with bichromated gelatine, and have frequently encountered great difficulties in practice, after being dazzled by a facility which does not always recur, especially with certain colours and various sorts of blacks. A serious difficulty often occurs with the negative, which, good for ordinary printing, is not always so for carbon printing."

M. Humbert de Molard announced his intention of shortly presenting to the Society, some sheets of collodion which he is now preparing in concert with M. Briois, to replace the partially coloured glasses employed in positive printing to obtain graduated backgrounds. These sheets are easily handled, as flexible as parchment, but more difficult to tear; introduced into the printing frames, they appear to advantageously replace the glasses, which too often break during printing.

M. Bernard Renault made a communication upon the action of light upon the salts of copper, which has already appeared in the columns of the Photographic News, he has since supplemented it with some further observations, which will be found in our next.

M. Poitevin remarked upon this communication, that following the researches of M. Edmund Becquerel, he had occupied himself with the same subject; he also had obtained pictures, but like M. Renault, he had not been able to fix them.

M. Robinet made the following communication upon a quick method of washing positives.

Upon their removal from the hyposulphite bath, they are

immersed in a dish full of water, and allowed to remain there several minutes, after that, each proof is placed between triple sheets of thick blotting paper, and subjected to strong pressure, for which purpose a simple copying press will serve. This operation repeated three, or at the most four times, suffices to completely remove the salts retained in the pulp of the paper, and constitutes a washing by displacement. In less than an hour, I have dried more than 150 proofs by this process, which have given no traces of hyposulphite of soda in the paper, when tested.

M. Davanne said that he believed he might claim priority in this method for M. Bayard, who, many years ago, published the means of completely removing hyposulphite of soda from positive proofs. His plan was to place each wet proof between sheets of blotting paper, and press them with a glass rolling pin.

M. Robinet concluded his letter by calling the attention of members of the society to the difficulties they encounter sometimes in cleaning old glass plates; he stated that he had often seen the plates resist the action of the most powerful acids.

Several members replied to this observation, remarking that the glass plates are often left too long in the strong alkaline baths, where they lose their polish to such a degree that their employment becomes impossible.

M. Mathieu Plessy exhibited the combustion of magnesium wire, in an apparatus procured from England, in which the magnesium wire, when once ignited, burns spontaneously, which, however, gave bad results, for this apparatus does not deliver the wire fast enough to follow the rapidity of its combustion. Struck with this objection, M. Mathieu Plessy thought that it would be an advantage in not reckoning solely upon the spontaneous combustion of the metal, but to direct the latter upon a very hot fixed flame, incapable of exercising any influence upon the photographic properties upon the magnesium light. The flame which best fulfils these conditions is hydrogen. Starting from these data, M. Mathieu Plessy has constructed an apparatus in which the magnesium wire, unwinding in a regular manner, and guided by a tube, presents itself to the flame of a hydrogen lamp.

The following is from the *Gazetta del Popolo*, of Florence:—

"The foreign journals, especially those of England and America, have frequently spoken of a curious experiment made upon the corpses of persons who have met with a violent death—an experiment which consists in representing (by photography) the eyes of the victim, and thus obtain an impression of the last object seen by them, which, it is assumed, remains intact upon the retina of the eye. Our own journals now state that the experiment is successful, but few persons believe it, and still less the savants, who are wholly incredulous.

"When the body of the woman Spagnoli was discovered, Signor Leopold Vût, superintendent of the corps for public safety, resolved to put this proof to the test. The photographer, Semplicine, was entrusted with the operation: he produced, with his best apparatus, an eye of the unfortunate Spagnoli; then it followed, by processes too long to be described, to enlarge the photographic image to the dimensions of a salad bowl. Arrived at this point, and after carefully taking proofs, it resulted that in the eye there was seen the strongly marked contours of the lower part of the face and right cheek of some person, and which bear a resemblance to one of two individuals accused of the murder. This eloquent picture is in the hands of the judicial authorities, who have seen the accused, and had his photographic portrait taken, which *they say* is as like the other as two drops of water!" *Credat Judæus!*

MAGNESIUM LIGHT IN DULL WEATHER.

Dear Sir,—In reply to your correspondent's letter in last week's News, relative to portraits by magnesium wire, signing himself G. W. O., I would suggest for information sake, that three fine wires twisted and burning at an angle of about twenty-five degrees above and on the broadside of the face, and one flat wire burning below on the other side, at an angle of about fifty-five degrees for the shaded portion well screened off from view of the lens will take a very passable negative in from forty to sixty seconds.

I inclose you three card portraits taken in this manner with the assistance of my newly invented reflector lamp. I also send you one taken in foggy weather with the daylight on the shaded side, and one flat wire burning in my lamp for the high lights in thirty seconds, which would have taken seventy seconds without the assistance of magnesium light, and would be nothing equal to it. Should any of your readers wish, I will forward them a card taken by magnesium wire burnt in my lamp in connection with daylight alone, by directing to my establishment or through my agent, Mr. Solomon, Red Lion Square, London. In the course of a few days I intend publishing full instructions for the using of magnesium light, free by post on receipt of seven stamps.—Yours very truly.

Nottingham, November 22, 1864. Alonso G. Grant.

[We think it is very probable that the use of magnesium light to give brilliancy to high lights may be found available in dull weather. The prints enclosed are very satisfactory. An instructive and interesting letter on the subject from Mr. Brothers, of Manchester, who has so successfully applied the light, arrived too late for the present number, but will appear in our next.—Ed.]

THE WOTHLYTYPE PATENT.

Sir,—I feel that photographers have good right to feel very indignant with the "United Association of Photography" for very nearly disgusting the photographic public with what promises to be a very beautiful process, by suppressing the fact that nitrate of silver was employed in the process in their own explanations, and by leaving uncontradicted the statement in the *Times* and other journals, in which it was said that nitrate of silver was abandoned. These articles were doubtless written by the inspiration of some one connected with the Association, or were at least based upon information supplied by the Association, who, I cannot but feel, have in this matter been guilty of something like the *suppresio veri* and *suggestio falsi*. The consequence is, that now, when the revelation is made, everybody is disgusted with both the process and its sponsors. The latter fact is of little consequence to photographers; but I think the former is. So far as I can see there is much that is beautiful in the process itself, and I fear that many will allow their feelings of annoyance at being duped into a belief that no nitrate of silver entered into the pictures, to influence their judgment of the process. This will be foolish and wrong. I was much pleased with the remarks of Mr. Hughes at the South London meeting, reported in your last, and I would commend them to photographers generally,

If the Association had dealt candidly with photographers, and put forth the powers on the real claims, I believe they would have sold more licences; but my appeal is to my brother amateurs to aid in working out to perfection a process which promises to be especially adapted to their wants, and to communicate their results, as I shall do, to the Photographic News.—Yours faithfully, An Amateur.

Talk in the Studio.

Double Portraits.—We have seen a somewhat singular example of dual portraiture, which we are informed is exciting some attention in Paris. It consists of a card portrait with a gentleman in private costume seated at table with a glass in his hand. On the opposite side of the table is a standing figure, in military or volunteer costume, with a bottle in his hand, pouring something into the glass held by the other. Both these figures are really portraits of the same gentleman. As the perfect exactness in a small picture precludes the idea of double printing, some other mode of accounting for the curious effect is necessary. We have not heard any explanation given, but we may suggest one or two possible methods. It seems evident that after posing, focussing, &c., before the first figure is taken, one half of the plate is screened, in some way from any action of light. This may be effected by means of a black screen placed in front of half of the background accessories, &c., a little out of

focus, or a black screen inside the camera, covering half the plate, would answer a similar purpose. The first figure, and portion of the accessories having been secured, a similar screen covers that half, whilst the other is uncovered to receive the other pose. The effect is rather droll than pleasing, but we understand that it "pays" the portraitist.

SHAKSPEARE'S PRAYER-BOOK.—The various pages bearing the signature "W. Shakspeare," in the recently discovered black-letter prayer-book, alleged to have been Shakspeare's, have been photographed by Mr. Whitlock, of Birmingham, to afford those interested in the matter, an opportunity of more perfect estimate than can be attained by description.

THE PATENT LAWS.—It is understood that the following will be the most important recommendations to be made by the Royal Commission which has been appointed to examine and report upon the Patent Laws: "1st. That the present system of obtaining and paying for letters ought to be maintained; but that patent fees should not be made to contribute to the general expenditure of the State until every reasonable requirement of the Patent Office has been satisfied. 2nd. That no patent be grated if it be found, after examination, that there has been any previous documental publication of the invention; but that no investigation be entered into concerning its merits. 3rd. That one of the judges should sit for the trial of patent cases exclusively; that he should be assisted by scientific assessors; should sit without a jury, unless the parties to the suit or action desire a jury, and when sitting without a jury, that he should decide questions of fact as well as law. 4th. That the granting of licences to use patented inventions ought not to be made compulsory. 5th. That patents ought not to be granted to importers of foreign inventions. 6th. That no patents should be extended beyond the original term of fourteen years. 7th. That the Crown should be empowered to used patented inventions without having obtained the consent of the patentee, and should pay him for such use a sum to be fixed by the Treasury."

To Correspondents.

GEORGE SMITH.—So far as we can judge from the diagram, the proportions of the house will be pretty good. We should prefer the side-light extended a little further in front.

R. M.—We prefer No. 2 in your list. Your letter had not reached us, or it would have been answered in the following week's NEWS.

CYMRO.—You will find the details of the copyright case in question, and the grounds of the non-suit, stated on another page. An agreement in writing is necessary to secure the copyright to the photographer, when the work is a commission. We will endeavour to carry out your suggestion shortly.

W. H. S.—Your error appears to be in the use of too little nitric acid. The amount of carbonate of soda produced by precipitating 30 ounces of bath solution will require very much more nitric acid than you appear to have added. Begin again and add an ounce of nitric acid, to commence with, and do not attempt to add the water until nearly all the carbonate is dissolved by the nitric acid.

A YOUNG PHOTOGRAPHERESS.—You have adopted the right plan of using kaolin, but have added too small a quantity. Try 3 or 4 teaspoonfuls, and agitate the solution with it. Then allow it to stand until it settles, and pour off the clear portion, filtering that, if necessary. You can then allow the kaolin to remain in the bottle, and it will thus clear the solution several times. Or you will find adding a few drops of a solution of common salt will cause a precipitate of chloride of silver, which will take down with it the colouring matter.

JAMES COOPER.—The markings at the top of your plate most resemble those which arise from the use of an over-iodized collodion. Try the addition of a little plain collodion to that in use, or try another sample.

DOUBLEVIEW.—Beaufoy's acetic acid is an indefinite term. We never state formulæ ourselves, involving its use. As a rule, about three parts of this acid should be employed for one of glacial acetic acid. You may continue to use methylated spirit for developing solutions, without fear.

HYPO.—When the hypo begins to turn brown, it indicates some decomposition, and it should be discarded. It is very cheap, and should be thrown away the moment it becomes doubtful. A piece of chalk may be kept in it to prevent it becoming acid.

JUSTITIA.—So far as we understand the matter, £10 10s. is the sum the Association charge for a licence; any legal expenses—and we believe there are some—being paid by the licensee. We do not know the amount, but believe not much. 2. We cannot tell you the extent to which the matter has been already taken up by the profession, as we have no data. A great deal of disappointment has been expressed by photographers generally, on ascertaining that silver is not entirely got rid of.

EXCELSIOR.—The best plan you can adopt, when you find that a varnish lowers the intensity of your negative too much, is to intensify sufficiently to allow for this lowering. All varnishes render the dense parts of a negative slightly more transparent. It is possible with mercury and iodide of potassium, to obtain any amount of intensity; but there is danger of the negatives so intensified eventually becoming hard, by the light acting upon them. We cannot recommend you to trust to a home-made varnish. The simplest we know is gum dammar, from 20 grains to 40 grains dissolved in an ounce of benzole; but this is scarcely a sufficient protection to negatives.

R. G. T.—As specimens of printing, the cards enclosed are very respectable indeed, for a student of only two months' standing. The formulæ you mention are very good. The toning bath of acetate of soda and gold will give you fine purple tones, but not black tones so readily. If you require black tones, the lime toning baths, for which we have given several recipes recently, answer best. The old gentleman you send is a little over-printed. We do not see for what purpose the box you mention can be used. In choosing a lens, the purpose for which you require it, and the question of expense, are important elements, which you do not mention. If you desire the best possible, send to one of our English manufacturers, state the purpose for which the lens is required, and you will get a good one. If expense be an object, French lenses are cheaper.

ONE WHO STUDIES THE NEWS.—We prefer No. 1 of the plans sent, and in it the arrangements generally are good. The dark room is in a good position. If equally convenient, we should place the background end to the south. Three or four feet wider would be an advantage. We should place glass in the dotted lines. The height will do, but the pitch of the roof is scarcely sufficiently steep. Let it be nine feet at the eaves and thirteen or fourteen feet at the ridge. 2. Our plan of making the NEWS was adopted in obedience to the general request of readers; originally, we made the volumes terminate half yearly.

A NORTHERNER.—The tendency to secure the monopoly in small improvements, by means of patents, is much to be deprecated. The glaze upon the card you enclose appears to be very good indeed, and we shall be glad to receive further details of the method of producing it. We are obliged by the statement of your experience in the matter of blistering, and shall have pleasure in publishing it.

CHOSE.—We do not know of any process of photolithography which has as yet given good results for portraiture. That is a problem which remains to be solved. The best results obtained hitherto have been copies of subjects in line. Some progress has been made in obtaining photographic half-tone, but nothing nearly perfect. An article in No. 307 of the PHOTOGRAPHIC NEWS explains how the matter stands in this respect. Our ALMANAC for the years 1861 and 1864 is in print. The camera you mention is a good one. The lens you mention may be pretty good for some purposes. We have tried the first and last of the collodions you mention, and find them good. We shall be glad of a further description of the camera stand, if it be a novelty. We fear that we cannot send you a photolithograph, as we do not know of any good examples which have come into the market as things for sale.

GADSHILL.—The address is 124, Brompton Road; but we apprehend that you may procure the work through any bookseller.

T. REVON.—The chief use of a swinging back to a camera, is to permit the sensitive plate to be kept parallel with the object to be taken, when it is necessary to tilt the camera. It is chiefly useful for architectural subjects. Suppose, for instance, that in taking a high building, it is necessary to tilt the camera, in order to take the upper portion. The plane of delineation, *i. e.*, the sensitive plate, not being parallel with the building, the upright lines will converge; but if a swinging back be used to keep the plate quite parallel with the building, there will be no such convergence. The swinging back is sometimes used in other cases, but this is its chief use. We could offer an opinion as to the cause of the spots better after seeing an example. It is possible you add silver too freely to the developer. The lenses in question give very admirable results, used for portrait busts. We are always glad to answer our correspondent, but shall be glad if, in addressing us in his own language, he will write as legibly as possible. A foreign language written hastily is troublesome to decipher.

J. W. S. S.—The chief cause of your difficulty in obtaining black tones, is want of intensity in your negatives. In order to obtain deep tones in a print, it is necessary that the negative be sufficiently intense to permit some over-printing, and so secure a deep deposit of silver in the shadows of the print. With the negatives, from which enclosed prints were produced, print in the shade, and a little deeper than you have done. We do not, however, dislike the warm tones ourselves. Negatives, which show like positives, by reflected light, sometimes print very well, if not under-exposed.

TYRO.—We are obliged by your note. It is quite possible that chloride of ammonia, or some other chloride, may answer the purpose better than that of sodium. The process will require experiment to arrive at the best results. We will mention your request to Mr. Cooper.

CAPTAIN BONAMY.—We are obliged by your communication, and will send for the parcel, and then refer to the subject again.

G. M. P.—The *Times*, and some other journals, in referring to the Wothly-type process, certainly stated that nitrate of silver was discarded; but the photographic journals made no such statement. From our previous knowledge of uranium printing, we believed, from the first, that silver was used, but speculation was of little avail, in regard to a subject which must necessarily be published shortly. In our own first experiments, to imitate the results, we used nitrate of silver. If the Association sanctioned the articles, saying that silver was discarded, they did a foolish thing, inasmuch as they created false hopes, which were doomed to disappointment. We think, however, the process has claims of its own, well worthy of consideration.

WILLIAM MCNICOL.—We are obliged by your communication, which shall receive attention in our next.

T. A.—We agree with you regarding the carbon process. If the practical difficulties can be removed and made less, it must be regarded as the best means of securing permanency. We will give your other remarks our attention.

FREDERICK BRETON.—We are much obliged by the additional specimens of microscopic enlargements. We will look out for some of the best articles on transparencies, and direct your attention to them.

N. H. is thanked. We shall be glad to receive his further communications.

Several Correspondents in our next.

Photographs Registered during the Past Week.

MR. WILLIAM MAYLAND, Cambridge,
Five Photographs of Dr. Whewell.

MR. THOMAS BULLOCK, Buckley Terrace, Macclesfield, Cheshire,
Two Photographs of E. C. Egerton, Esq., M.P.

MR. JAMES BURKE, 44, Lower Ormond Quay, Dublin,
Photograph entitled "Courtin'."
Photograph entitled "Meeting the Good People (Fairies) on the way Home."

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THE PHOTOGRAPHIC NEWS.

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FIXING ARGENTO-URANIC PRINTS.

ESTIMATE OF PROPORTION OF SULPHO-CYANIDE OF AMMONIUM REQUIRED.

SOME recent experiments we have undertaken with a view to ascertain the amount of sulpho-cyanide of ammonium and the strength of the solution necessary to fix a given number of the argento-uranic prints, taken according to the Wothly-type or similar formula, have suggested conclusions which will doubtless be interesting to our readers. The infinitessimally small proportion of silver employed in the preparation of the paper, and the still smaller proportion remaining in the print to be removed by fixing agents, at once suggested that the amount of a fixing agent necessary for removing the unaltered silver salts would be exceedingly small. If the results of our experiments are confirmed by extended practice, it will be seen that the proportion is much less than past experience with fixing processes would have suggested.

In order to make the results of the experiments clear, it is necessary to remind the reader of some of the properties of the sulpho-cyanides when employed as fixing agents. When salts of silver are placed in contact with a solution of the sulpho-cyanide of ammonium, sulpho-cyanide of silver, or of double sulpho-cyanide of silver and ammonium, is formed. The new salt formed is not, however, soluble in water, but only in a solution of the alkaline sulpho-cyanide. If, therefore, sufficient of the silver salt be added to decompose the whole or a great part of the sulpho-cyanide, the double sulpho-cyanide of silver and ammonium, instead of remaining in solution, would be decomposed into sulpho-cyanide of ammonium and sulpho-cyanide of silver,—the former remaining in solution, and the latter being precipitated.

In order, therefore, to secure the fixing aid of sulpho-cyanide of ammonium, we must use not only sufficient to combine with the silver, but also sufficient excess to hold in solution the sulpho-cyanide of silver, which is formed; and we must avoid diluting the solution, either as a fixing bath, or in the first washing process, to such a degree as to decompose the double salt of ammonium and silver.

In order, then, to get at some idea of the proportion of the sulpho-cyanide of ammonium necessary to fix a given number of argento-uranic prints, we proceeded as follows: we made a bath containing one ounce of sulpho-cyanide of ammonium in eight ounces of distilled water. Of this we placed one drachm in a test tube, and added drop by drop ten drops of a thirty-grain neutral solution of nitrate of silver, each drop first producing a precipitate which was at once re-dissolved. We now added a few drops at a time of distilled water to the solution; it was not until we had added three drachms of water that any signs of turbidity were manifest, and a few drops more produced a precipitate. From this it would appear that seven grains and a half of sulpho-cyanide of ammonium, dissolved in four drachms of water, were sufficient to decompose ten-sixteenths of a grain of nitrate of silver, and hold the salt thus formed in solution; but the moment the quantity of water was increased beyond that, the solution became too dilute, and the sulpho-cyanide of silver was precipitated.

We next took, in a test tube, a drachm of the same solution of sulpho-cyanide of ammonium (containing one part in eight of water), and added the neutral thirty-grain silver solution, drop by drop, until turbidity began to appear, this was at the seventeenth or eighteenth drop; and when twenty drops were added, it was quite turbid. Ten drops of fresh sulpho-cyanide solution were then added, which quite cleared that in the test tube. Half a drachm of water made it permanently turbid and eventually caused a precipitate, showing that a very slight dilution decomposed the double salt when the solution of the alkaline sulpho-cyanide was nearly saturated with the silver salt.

These and similar experiments we repeated several times with little variation in the results. Our aim was next to deduce some conclusions from these results which might serve as indices to the quantity of sulpho-cyanide to be used in fixing a given quantity of work.

It will be obvious to those who have read the details of our experiments in uranium printing, that the amount of silver employed in preparing the paper is exceedingly small. We used three grains of nitrate of silver in an ounce of collodion. Over how many superficial inches of paper an ounce of collodion might be spread we cannot with certainty say; but we think we are within the mark when we estimate it as covering a dozen whole plates, which would give a quarter of a grain of nitrate of silver for each. When we remember that a portion of this is reduced in forming the image, and a portion more is dissolved out by washing before toning and fixing, it becomes apparent that an infinitessimally small amount is left to be removed by the fixing bath, and that a very small amount of sulpho-cyanide of ammonium will suffice for the purpose. But still the question remains unsettled as to how much that little may be; and as it is difficult to estimate the exact amount of silver used in the preparation of a sheet of paper, we proceed to estimate the amount to be used in another way, which will be found, we think, tolerably simple and satisfactory.

The method we propose is to calculate the amount of nitrate of silver employed in an ounce of collodion, and, disregarding the portion which goes to form the image and the portion which is removed from the paper by washing, employ for each ounce of collodion used a certain amount of sulpho-cyanide in fixing. From the experiments recorded above, it will be seen that one drachm of solution of sulpho-cyanide of ammonium, containing one ounce in eight of water, decomposed and held in solution about seventeen

drops of a thirty-grain nitrate solution. In other words, 7½ grains of sulpho-cyanide of ammonium, dissolved in a drachm of water, performed what is practically the "fixing" process on one grain of nitrate of silver. Assuming, then, for use a collodion containing nearly five grains of nitrate of silver in an ounce, which is a little more than we have used, it follows that a hundred ounces of sensitive collodion, which would contain one ounce of nitrate of silver, would only require seven ounces and a half of sulpho-cyanide of ammonium, dissolved in eight times its weight of water, to fix all the paper prepared therewith. To put it more simply, for each pint of the sensitive collodion used in coating paper, one ounce and a half of sulpho-cyanide of ammonium, dissolved in twelve ounces of water, should be employed in fixing, and if two grains of chloride of gold be added to this solution, it will form an excellent toning and fixing bath in one solution.

It must be borne in mind, however, that if the print fixed in this solution be placed at once in a large quantity of water, the portion of the fixing bath which clings to the print becoming diluted will decompose, leaving traces, inappreciably small, it is true, of sulpho-cyanide of silver in the print, which will not be removed by subsequent washing. The prints should, therefore, on removal from the fixing bath be rinsed in a very small quantity of water for a few minutes; this will remove, without decomposing, the bulk of the sulpho-cyanide solution and the silver it contains, and three or four, or half a dozen changes of water given in the course of an hour will complete the washing. As we have shown on a former occasion, the per-salts of iron are most perfect and delicate tests for the sulpho-cyanides, the finished print may easily be examined for any trace of the fixing salts or for any trace of sulpho-cyanide of silver. A drop of a weak solution of perchloride of iron applied to the wet print will show a red stain if any sulpho-cyanide remain. If this test be applied after the print is well washed, and the red stain appears, it is probable that some trace of the sulpho-cyanide of silver remains. Here a valuable property of this mode of fixing will become apparent. A print imperfectly fixed in hyposulphite of soda is ruined. The insoluble compound of silver and hyposulphite once formed is not redissolved in excess of fresh strong solution. With the sulpho-cyanides this is different: the sulpho-cyanide of silver, although precipitated by too much dilution of the fixing solution, is at once redissolved by a stronger solution of the alkaline sulpho-cyanide, and no harm is done. In this case, therefore, a suggestion we have before made, and which has been verified and recommended by Mr. Emerson Reynolds, in an interesting article on these salts, may be adopted. This consists in submitting the washed print to another solution of the sulpho-cyanide, one part in seven or eight, which might be kept for this purpose, and would last a very long time. This would remove the final traces of silver, and, after further washing, the proof would be finished, and, we think, safe. We believe, however, as we have stated in former articles, that with the exercise of intelligent care, this second trouble would be unnecessary.

In working a new process much must remain to be verified by practice; but it appears to us probable, so far as we can judge from experiment and from theoretical consideration, that argento-uranic prints, produced with or without the aid of collodion, toned with gold and fixed as we have described, will be more permanent than albumenized prints. The fatal compound between silver and albumen, which is not decomposed by ordinary fixing agents, and which remains in the whites of the picture, almost certain to discolour by the action of light in time, is absent in the prints to which we have referred, and this consideration alone is one of great weight, and entitles the process, and any other with imilar immunities, to attention.

We should add that the same considerations and calculations, with the requisite modifications to suit proportions, are equally applicable to the fixing of prints by our process of using chloride of silver in collodion, or in any process where the proportion of silver salts in each sheet of paper is a fixed quantity.

BLURRING, HALATION, NUBATION, &c.

We have a few words to add to the discussion on the subject of "Blurring" which originated in our columns a few months ago.* Since we last wrote on the subject, we have been favoured with several specimens and some further correspondence by Major Russell, and it is especially in justice to this gentleman, and to those who have his views, that we refer to this matter again. An examination of the specimens forwarded by Major Russell, has reminded us of the trite apothegm, as to the importance, in beginning a controversy, of defining terms. The negatives and prints forwarded by Major Russell, to illustrate his optical theory of blurring, contain no examples of what we understand by "blurring" at all, but are marked illustrations of another defect, which has been termed by some one—Mr. Shadbolt, we believe—*nubation*. We had been speaking of two distinctly different things.

There are three kinds of abnormal deposit, producing either irregularity of form or irregularity of light and shade. These are probably as distinct in their causes, as they are in their results, but they are nevertheless sufficiently associated in their character to account for some persons confounding the one with the others. It is necessary in taking leave of this subject briefly to recapitulate the definitions of the different phenomena, although in doing so we can do little but repeat ourselves. Had the terminology of our art been more definitely settled, possibly the misconceptions which have crept into the discussion might have been avoided. It appears to us, however, that the three defects may be best named, and will be most easily and commonly understood as *halation*, *nubation*, and *blurring*. We will briefly repeat what we have said on former occasions, to explain what we mean.

The phenomenon known as *halation*, consisting of a line of light surrounding dark objects is, we believe, due to chemical or physical causes. When the developer comes into contact with the free nitrate on a part of the plate containing a dark object, there is little tendency to reduction because the action of light on the subjacent iodide has not induced the necessary conditions; but the moment the free nitrate and developer come into contact with a part where light has acted, not only is the free nitrate belonging to that part at once reduced, but the free nitrate swept from the dark part where it could not be reduced, is at once thrown down, forming on the edge of the lighter portion a line of increased density, shown in the print by a line of light, or a fine halo round the dark parts. This tendency is greater in some conditions of the chemicals, not quite well decided, but we have remarked it most frequently, when the collodion has possessed but little bromide, and the plate has been slightly under-exposed.

Nubation, as Mr. Shadbolt proposed naming the defect, consists in an encroachment of light upon the darker portions of the picture, producing a fogged effect. It is most frequently seen in interiors, surrounding a window, in landscapes where masses of sky are seen through the branches of trees, sometimes in portraits on the black drapery surrounding a mass of white, such as a shirt breast; and in various other circumstances. It is most frequently met with when the lens is pointed towards the light with dark imperfectly illuminated objects cutting against that light. This was really the effect in all probability to which Mr.

* The above article was in type and intended for insertion last week; but the discussion at the North London meeting occurring after the article had left our hands, it occurred to us that it would increase the interest if we deferred its publication until the discussion at the meeting in question was also published. The discussion suggests nothing to add to our remarks, beyond calling attention to Mr. Hughes' excellent observations on the subject.

Marlow referred in a paper read before the Photographic Society three or four years ago, when he designated it *halation*. As halation was a term tolerably well understood as indicating another defect which we have described above, and as Mr. Marlow's explanations were felt not to touch that defect, the paper excited less attention than it was probably worthy of. This same defect which Mr. Marlow mis-named *halation*, Major Russell has mis-named *blurring*,* and hence the misconception and discussion which has arisen. It is tolerably clear from the experiments he has undertaken, that actinic light passing through the plate, and reflected back again, is a frequent cause of nubation, or fogging from reflected light. Diffraction has generally been held to account for this defect; but it is probable that by far the most frequent cause may be the reflection to which Major Russell refers, and for which his experiments have pointed out a remedy. It must not be forgotten, however, that there are other causes which at times produce similar results, when the abnormal effect of light may be seen on the ground glass. For some remarks on this subject, we refer our readers to Dr. Towler's able article, on page 524 of the present volume. That this *nubation* is not always due to reflection from the back of the plate, is tolerably clear from the fact that it occurs at times in the calotype process. Nearly half-a-dozen years ago the editor of the *Photographic Journal* himself, one of the most accomplished and experienced calotypists the art has known, speaks of the defect as not uncommon "both in wet collodion and CALOTYPE; a landscape having a distant hill has frequently a fimbriated edge all along the margin near the sky, showing a sort of unnatural halo."

By *blurring* we mean that irregular or imperfect definition of fine lines, or encroachment of other light objects upon such lines as almost entirely obliterates them. If the reader will take a pen and ink, and draw a line by their aid, and having done this, attempt to go over the same line again with the ink, he will produce a blurred line. Branches or twigs of trees impinging on the sky, are often blurred and almost obliterated. The rigging of ships suffers in like manner. The Marseilles Photographic Society complained of a similar difficulty in rendering the fine lines of engravings copied by the tannin process. These are examples of what we understand by *blurring*. As to its cause we can but repeat what we have said before: without wishing to dogmatize on the subject, we are disposed to regard it as the result of chemical or physical action rather than of optical causes, for several reasons. We have more frequently received complaints of its presence with the tannin process than with other dry processes, and we have found it present in the wet processes under some conditions, and absent in others; and that independently of the opacity or transparency of the film. It has appeared to us frequently to result from a tendency to lateral reduction or spreading of the deposited silver, a fine line, like a twig, stretching across the sky, has thus an encroachment of deposit on each side of it, filling it up and partially or entirely obliterating it. This more frequently happens where the exposure has been long, and the development is rapid and energetic, than when it is slow and gradual. With a simply iodized collodion the reduction is generally more rapid and energetic than when a bromide is present, and we have noticed a greater tendency to this blurring with the iodized collodion. The presence of a bromide renders the development more deliberate, and the tendency to lateral deposit appears to be lessened.

To do the fullest justice to the explanation of the confusion which has arisen from the indefinite use of terms, we give some extracts from Major Russell's letters. He says:—

I have been thinking over the matter, and it seems to me that our difference of opinion may be explained partly in this way—we are arguing about different things. It will, I think help to clear the matter, if I define more clearly what I understand by "blurring."

It is a halo surrounding the edges of the sky, or other strongly lighted part of the subject, when this is much over-exposed. The halo extends to a distance varying with the intensity or continuance of action of the reflected light, and with the thickness of the glass, but I have never seen it extend less than about one-eighth of an inch—commonly a quarter or more—the halo extends further, the further removed from the centre of the field, and may be seen by transmitted light, if at all marked, and by reflected light, if the negative is bright, by the bloom or leather colour, which distinguishes the parts slightly acted on by light, from where it has not acted at all, this appearance, as has been before remarked, is most plainly seen *behind*. The halo colours every small object on the sky, and, as far as it extends along its edges, making such objects print faintly, and sometimes nearly, or quite obliterating them.

The halo round a window in an interior, as I have said before, is a common instance of what I understand by blurring.

The fault which you refer to as "lateral deposit," seems to me to be of quite a different kind, and caused in another way; it never struck me till lately, that this might be confounded with blurring. The two faults have nothing in common, except that they may both obliterate small objects against the sky, but as they may both be produced on the same plate, they may not unnaturally have been supposed to be the same thing. The lateral deposit, as I understand it, is caused by the "piling up" of coarse granulated silver on the dark parts of the negative in such a way, that the deposit looks *dead* by reflected light and makes the high lights of the paper print chalky, and devoid of detail, and of course when this deposit is thick it encroaches on the edges of the transparent parts of the negative, injuring their delicacy of outline, and often quite obliterates small objects against the sky. This fault is produced by mismanagement of the development, adding too much silver in proportion to the acid, and has nothing to do with the process. When a very young photographer, I was much troubled with it in the wet process, whenever I added much silver solution to produce intensity, but more particularly with collodio-albumen, developed with gallic acid and much plain silver solution. To avoid this evil, I have recommended that silver should never be added to the developing liquid without acid enough, and to ensure this, that the acid should be mixed with the silver.

I have so entirely avoided the fault in this way in my own practice, that I do not recollect ever to have seen any trace of it on my tannin plates, and had almost forgotten its existence until your expression "lateral deposit" recalled it to my mind. It is easy to distinguish this evil from "blurring" when only one of them exists on a plate, for the lateral deposit extends but a very little distance. Now, I hold that a negative cannot be a really good one when there is any deposit on the dark parts, that is, any visible deposit on the surface. On looking along it towards the light, if there is any difference in brightness, the sky and other dark parts should be the brightest, in fact, as bright as glass, mine always are so. I have found no tendency to lateral deposit on tannin plates when properly developed. I enclose a print from a tannin negative, which would be good if it were not spoilt by blurring. There is on the negative, I believe, no lateral deposit. The blurring is most marked where there is the greatest body of light, as it must be if caused by reflection of diffused light. If there were lateral deposits, why should it not be formed where the sky is seen only in small patches? By the reflection theory when the light is in small patches only, are being diffused by the film, it is broken up and weakened, so that it does not produce much effect. The general appearance is much as if a lighted taper had been held behind the middle of the strongest lighted part of the plate.

Returning to the subject of *nubation*, which is a defect to which every process may occasionally yield, but which must be most frequent when the film is thin and transparent, we repeat that Major Russell's recent experiments have thrown

* We must not be understood in any sense offensively in regarding the use of the term *blurring* to express this defect, as an error. We had never seen, that we remember, the term so used before; and it certainly does not in our estimation, express the idea; Major Russell subsequently describes the effect as resembling fogging, extending from one-eighth to one-fourth of an inch over the darker portion, and we have an example before us where it extends nearly half-an-inch; but it is not a blurred or irregularly formed line or image, but a distinct fogging from the action of light. *Halation* might have expressed it, had that word not already been appropriated to express another phenomenon. It must be remembered also, that this discussion arose from Major Russell taking exception to an answer to a correspondent in our own columns, who had consulted us as to the cause of blurring in our own sense of the word.

considerable light on the subject, and he feels that the defects and its remedy have not yet received sufficient attention. On this subject, he remarks :—

The matter has a much greater importance and wider scope than the mere question of the use of tannin and yellow paint. I lay no great stress on this last, it is a convenient way of testing the effect of reflected light, and I find in practice that the improvement thus produced is quite enough to repay the trouble of painting, but without this, where the cause of blurring is understood, it is easy to prepare tannin plates quite as free from blurring as any others. My last published method with bromized collodion is very satisfactory in this way when the exciting and washing are not carried too far, and the tannin not too strong, because the image is confined to the surface, and the reflected light has to pass a second time through a very non-actinic medium before it can affect the picture. In this way, it is true, a little of the characteristic richness of the tannin negative is lost, and the picture rather resembles those by other dry processes. These views were curiously confirmed a short time ago. I was looking over some views by one of our best landscape photographers (wet collodion) and observing that there was a very unusual absence of blurring in trying subjects (well exposed), made enquiry how the plates were prepared. I found that they were excited for a very short time, thus securing an opaque but insensitive stratum below the thin sensitive surface, but learned that, as might be expected, the negatives were very faint, and had to be printed in the shade.

Did you never, in looking over a collection of photographs, observe the great difference in quality between those which represent dark objects or foliage all over the picture, and those which also represent a large extent of sky? I often have, and have much wished that some means of improving the last sort could be found. I believe that the optical theory explains the inferiority, and suggests means by which it may be avoided. The subjects presenting great contrast suffer from under-exposure, because the photographer knows, by experience, that blurring, loss of distance, and fogging will be produced by sufficient exposure for dark objects, hence it happens that, commonly, the best pictures in other respects are most disfigured by these faults, which are commonly supposed to be the natural and unavoidable effects of long exposure in subjects containing much sky.

Some photographers doubtless avoid the above mentioned evils more than others, but, as a rule, they do not know why. I believe that if proper means are taken to cut off by diaphragms (in the camera) reflected light from the sides of the camera, and to prevent the ill effects of transmitted light, subjects containing sky can be exposed (without ill effects, except increased paleness of sky) nearly as long as if the subject contained no sky, not quite, on account of flare from reflecting surfaces of the lens. A great deal of misapprehension exists about blurring; many persons say thay are never troubled with it, when all their pictures are more or less injured, directly or indirectly, by it. A friend of mine lately told me that his tannin negatives were always quite free from blurring; but after I had showed him some specimens and pointed out the slighter traces of it, he looked over his negatives again and owned that he had scarcely a negative by any process quite free from the evil. My eye has been, so to say, trained to the matter, and I rarely see a collection of photographs without noticing the effects of reflected light, which are to me quite an eyesore. Although till lately I did not know the cause, I have been troubled for many years with these effects, which I felt greatly limited the capabilities of photography, with the wet process and all others which I have tried; it is more true with tannin plates than others; this seems to me the only disadvantage which attends the use of tannin, and it is intimately connected with some of the advantages which this substance gives. I believe, however, that now the reason is known it will be found that the advantages far counterbalance the disadvantages in preparing dry plates.

Mr. Penny, of Cheltenham, writes as follows, adopting the idea of *blurring* which has been propounded by Major Russell —

Sir,—On the defect of "blurring," with which our friend "tannin" stands charged, it is, I think, desirable that all who have any evidence to offer, *pro* and *con*, should do so. It is difficult to understand from mere description the appearance to which the term blurring is applied; but I take it to be the defect seen in the stereograph No. 1 inclosed, formerly known as "halation." Am I right in my conjecture? Though the specimen is a modification of tannin, that known as "malt and tannin," I do not imagine this defect is peculiar to tannin, as it has happened to me in the oxymel process, under the same circumstances, viz., that of a dark interior, with a flood of light coming in at a window or other aperture. I strongly incline to the opinion that it is produced by reflection from the back surface of the glass; firstly, because, as has been already remarked, it shows most evidently at the back of the film; and secondly, because a certain collodion, well known in the market, which gives a transparent film when sensitized, is subject to this particular failing; and thirdly, because I never remember to have seen the same phenomenon in paper negatives, having recently hunted through some dozen old calotypes with that object in view.

Supposing the theory of reflection to be the correct one, the effect occurs, as I imagine, from oblique rays passing through the collodion film and glass, being reflected from the back surface of the glass at an angle, and so falling upon the back of the film.

If each ray passed in a direct line through the glass, and was reflected in the same line, I conclude we should not have the image blurred and confused as it is.

If I am right in my conclusion, may not the vexed question be decided by means of Sutton's panoramic camera, by coating with a transparent film, and exposing one of the "spherical bowls," in which case all the rays would fall directly through the glass? A fault attributed lately to tannin, of which I have no experience, is that of failing to render clearly fine lines, I am doubtful whether this be inherent in the tannin process; if it be, the modification of malt and tannin is not open to the same objection.

The specimen No. 2 having been taken in a very bright light, will, I think, serve as evidence of my assertion.—Yours truly, G. S. Penny

Cheltenham, November 4th, 1864.

Mr. Penny's specimen No. 1 is a genuine example of the defect which we think is most expressively phrased *nubation*, specimen No. 2 being a bright, crisp, well defined picture, in which every fine line is perfectly rendered, such as we have often seen produced by the tannin process by gentlemen who have rightly remarked that they have never been troubled with blurring, whilst others have repeatedly complained of it as chiefly occurring in the working of the tannin process.

SIMPLE PROCESS OF CARBON PRINTING.

BY M. MC A. GAUDIN.

The carbon printing process, practised for the first time by M. Fargier, occupies the first rank in photography for delicacy and permanence. It is this process that Mr. Swan has rendered more practical, and which has occupied so much attention in England. Silver printing upon enamelled paper is also as fine as carbon, and so is the uranium process, known by the name of *Wothlytype*, which recommends itself by a permanence nearly equal to that of carbon. But all these methods demand very complicated manipulation. To succeed by means of carbon requires that the luminous reaction should modify the vehicle, which seems to demand the employment of a certain darkness, and necessitates making the light to act at the back, through a film of transparent collodion; but certain considerations upon the mechanism of the luminous effect suggest a great simplification of the process.

If we take the daguerreotype, for example, we recognise that the sensitive film which produces its picture is of infinitessimal thinness, while by its hue it is nearly impermeable to light; and if we examine the proofs by the microscope we recognise that they are exclusively formed by a *seed*, of insoluble particles, which by their multiplicity upon a given surface produce the intensity of the lights. Upon collodion and chlorided paper we observe the same phenomenon. The picture is always produced by the union of *juxtaposed*, and not by *superimposed*, centres of action; hence, if we want to prepare a sufficiently thin carbonaceous

coating, there will result, by direct printing, a picture comparable to that furnished by silvered plate, collodion, and chlorided paper.

I have always been instinctively of this opinion, but this last consideration confirms me in the idea. In operating *grosso modo* upon ordinary paper, by covering it with a brush dipped in bichromated gelatine coloured with lamp-black, which leaves very apparent streaks, I have attained a very satisfactory result already; but by forming the film with all the skill imaginable we shall attain complete success.

To this end it will be necessary to apply the film to a perfectly uniform surface, unattachable by water; for example, upon strongly albumenized paper, glazed in the rolling-press before it is completely dry, and then to cover its surface by means of a soft leather stump, with an extremely thin film of bichromated gelatine coloured with lamp-black, washed with ether to remove the greasiness. In this case I maintain that the luminous effect will be translated, so to speak, in small circular radiating tufts, isolated from each other, invisible to the eye, distinguishable only by the aid of a powerful microscope, which produces the ordinary effect of photographic pictures.

Lamp-black of the best quality unites very well of itself with a solution of gelatine, but for greater security it must be previously freed from the resin it always contains by shaking it up with ether, and then putting it on a filter. After drying it, it is mixed with the gelatine by a prolonged grinding, and at the moment of applying it, add to the paste thus obtained a suitable portion of a filtered saturated solution of bichromate.

The paper is dried spontaneously in the dark, after it has been submitted to the action of light behind a negative; it is then put into warm water, and in the course of a few minutes, by rubbing it with a camel-hair pencil as gently as possible, the image appears, and after a prolonged washing in cold water, it becomes fixed and imperishable.—*La Lumière.*

DEVELOPMENT WITHOUT INTENSIFYING.

BY WILLEM MAC-NICOL.

Intensifying is a great trouble, and very bad system. I have lately made several experiments in order to find something which should enable me to give up entirely or in part that troublesome operation. After a great many careful trials, without much advantage, I use at last liquid ammonia and sulphate of copper (blue vitriol), added to the usual iron developer. With this I produce splendid negatives, without any trouble; they are full of detail, and possess soft shadows, very clear and clean, and require less exposure than with the ordinary developer. My negatives very seldom require to be intensified, and when they require it, it is in a very slight degree. In such case I effect it in the ordinary way, with pyrogallic acid and silver.

My formula is as follows:—

Water	10 ounces.
Sulphate of iron	2 drachms.
Sulphate of copper	1 drachm.

Shake till the salts are dissolved, then add:—

Spirits of wine	4 drachms.
Glacial acetic acid	2 drachms.
Liquid ammonia	20 drops

Shake well and filter.

Instead of sulphate of iron, ammonia sulphate of iron can be used, then the liquid ammonia is not required.

If intensifying is required, my formula is as follows:—

1st Solution.

Distillated water	1 ounce.
Pyrogallic acid	4 grains
Citric acid	3 grains,

2nd Solution.

Distillated water	2 ounces.
Nitrate of silver	10 grains.
Acetic acid	2 drops.

Mix small quantities of the first and second solutions in equal portions before using.

I fix my negatives with:—

Cyanide of potasium	1 drachm.
Distillated water	5 ounces.

"THOSE WHO LIVE IN GLASS HOUSES*

—Should not throw stones," says the adage. But who ever *did* live in glass-houses before the days of Sir Joseph Paxton or the invention of photography? And why were they expected to be constantly pelting their neighbours? Has the sun necessarily a combative effect upon dwellers in those traps to catch sunbeams?

I, who live in a glass-house all day, am inclined to answer the last question in the affirmative, when aggravated by ugly or capricious sitters. May I, therefore, a humble photographer, venture one or two hints to the owners of countenances who desire them to be gracefully and accurately copied, and to those who try to copy them?

In turning over the leaves of an album, we frequently pass our acquaintances without even a nod. How is this? The photograph may be irreproachable as a work of art, and it is impossible to be other than a transcript of what was presented to the camera. How comes it, then, that it is not a likeness? Simply because the original was, at the critical moment, unlike himself. When about to be photographed, one is apt to feel that, like Marshall Ney, the eyes of Europe are upon him—that, according to the position which he assumes, judgment will be passed on his good or bad figure, awkwardness or grace He wishes to present himself on paper to an admiring, not to a critical, public. A nervous consciousness, moreover, that perhaps a guinea or two is involved in the operation, tends materially to add to his discomfiture. Trivial as this consideration may appear, it exerts a far greater influence on the expression than most persons are willing to acknowledge, even to themselves. Placed in a position always chosen by the operator (being, to save himself the trouble of rearranging accessories, precisely the same as that which the last sitter occupied), his head screwed into a vice behind, he is told to look at an indicated spot on the wall, and keep still. Thus posed, he regards further operations with much the same feelings of distrust as he would those of a dentist. In imagination, he hears the sharp rattle of the forceps, or the punch. His breathing becomes thicker and quicker as the critical moment arrives, his heart beats audibly against his waistcoat, and a hazy film falls over his eyes. In this delightful condition of mind and body, he is enjoined to "keep quite still, and put on a natural expression:" as if expressions were as easy to put on as gloves. The inevitable consequence is, that he "grins horribly a ghastly smile," the like of which never passed over his features before. Yet both operator and sitter wonder why the portrait is so very unlike.

"I should like to have a landscape background for my portrait, if you please," is a frequent, but most inconsistent request. What can be more preposterous than to see a lady in full evening costume, quietly seated in a luxurious easy-chair, in the middle of a mountain pass, with a roaring cataract rushing madly down within a couple of inches of her immaculate book-muslin? The rugged pinnacle to which she is supposed to have flown (in her easy-chair) being carefully adapted to her satin shoes by a Brussels carpets, from which a tree is vigorously springing. An actor wishing to be represented in some particular character, may, with propriety, require a painted background to assist in the illusion that he is on the stage, before his own painted scenes. Addison remarks, in the "Spectator," "a little skill in criticism would inform us that shadows and realities ought not to be mixed together in the same piece. If one would represent a wide champaign country

* The above clever sketch from Dickens' *All the Year Round*, contains so much of truth, and is evidently written by one who is familiar with life in the glass house, that we give it in its entirety.

filled with flocks and herds, it would be ridiculous to draw the country only upon the scenes, and to crowd several parts of the stage with sheep and oxen. This is joining together inconsistencies, and making the decorations partly real and partly imaginary."

There are as much individuality and character in the human figure, as in the human face. Every one has some slight peculiarity of gesture and carriage of body, as he has idiosyncrasy of mind. Assuming this to be so, with how much more character is a portrait in some accustomed position endowed than if represented in one to which he was unaccustomed. A right reverend prelate, engaged in the manipulation of three little thimbles and a small pea, or a blind man looking through a stereoscope, would scarcely be in harmony; yet photographs are frequently perpetrated in which ladies and gentlemen are represented in positions, and engaged in employments equally as foreign to those in which their friends usually see them. The conventional pillar and curtain are becoming intolerable. The conventional Smith or representative Jones, attired in his habits as he lives (say the guinea paletot and the sixteen shilling trousers), seldom has the opportunity of resting his elbow on the base of a fluted column; neither is he often interrupted in the study of his favourite author (one finger between the leaves of the book), seated in a lady's boudoir, radiant with bouquets and toilet bottles, nor with a mass of unmeaning drapery mixed up with his hair, like the hood of an excited cobra.

When two or more persons are taken in one picture, it is no uncommon thing to see them standing without any connection whatever with each other, as isolated and independent as the statuettes on the board of an Italian image man; or else, as if desirous of emulating the silver bells and cockle shells of perverse Mary, celebrated in the nursery ballad—all in a row.

A lady or gentleman, having made up her or his mind to be photographed, naturally considers, in the first place, how to be dressed so as to show off to the best advantage. This is by no means such an unimportant matter as many might imagine. Let me offer a few words of advice touching dress. Orange colour, for certain optical reasons, is, photographically, black. Blue is white; other shades, or tones of colour are proportionally darker or lighter, as they contain more or less of these colours. The progressive scale of photographic colour commences with the lightest. The order stands thus: white, light-blue, violet, pink, mauve, dark-blue, lemon, blue-green, leather-brown, drab, cerise, magenta, yellow-green, dark-brown, purple, red, amber, marone, orange, dead-black. Complexion has to be much considered in connection with dress. Blondes can wear much lighter colours than brunettes: the latter always present better pictures in dark dresses, but neither look well in positive white. Violent contrasts should be especially guarded against.

In photography, brunettes possess a great advantage over their fairer sisters. The lovely golden tresses lose all their transparent brilliancy, and are represented black; whilst the "bonnie blue e'e," theme of rapture to the poet, is misery to the photographer, for it is put entirely out. The simplest and most effective way of removing the yellow colour from the hair is to powder it nearly white; it is thus brought to about the same photographic tint as in nature. The same rule, of course, applies to complexions. A freckle quite invisible at a short distance, is, on account of its yellow colour, rendered most painfully distinct when photographed. The puff-box must be called in to the assistance of art. Here let me intrude one word of general advice. Blue, as we have seen, is the most readily affected by light, and yellow the least; if, therefore, you would keep your complexion clear, and free from tan and freckles whilst taking your rambles at the sea-side, discard the blue veil, and substitute a dark green or yellow one in its stead. Blue tulle offers no more obstruction to the actinic rays of the sun than white. Half a yard of yellow net, though, perhaps not very becoming, will be found more efficacious and considerably cheaper than a quart of Kalydor. The cause of freckles is simple enough. It is nothing more than a darkening of the salts of iron contained in the blood, by the action of light. A freckled face is, therefore, an animated photograph.

Still another reason why photographs are not always pleasing, either as likenesses or pictures, is that the time occupied in posing the sitter and securing the negative is not sufficient to allow much thought or care to be devoted to it. It was recorded in a photographic journal some time since, as a wonderful feat, and lauded accordingly, that one operator had taken ninety-seven negatives in eight hours, just five minutes apiece. Now, as no two individuals ought to be subjected to precisely the same treatment, that is, placed in the same position, or in the same lights, it is certain that fifty at least of those, measured by this modern Procustes, would be capable of much improvement. Sometimes, for days together, when the atmosphere is foggy, they can do nothing; and, therefore, it behoves them to make their hay while the sun shines.

Now for my trials: "How frightfully stout you have made me," remonstrates a lady weighing, probably, about a couple of hundred-weight; "I have had my portrait painted in oil and pastelle, but neither make me look so stout as you have. I declare I look like some fat, dumpy old woman. I wouldn't let any one see this for worlds. You really must do another." This lady is succeeded by another, of uncertain age, who wants a carte de visite taken of her pet dog (it is presumed, for him to distribute among his acquaintances). "I should like it taken very nicely, if you please. How do you think he would look best? In profile, three-quarters, or full-face?" "I think in profile," replies the artist. "Will you please make him lie down on the table." "Oh dear, he won't be still, I know, on the hard table; he must have a cushion to lie on." A cushion is accordingly procured, and Beauty is deposited thereon. "I think," remarks the young lady, after he is focussed and light arranged, "the other is the prettiest side of his face. Yes," turning him round, "he looks far more intelligent in this position." This, of course, necessitates refocussing and rearranging of the light. Just at the moment of exposure, Beauty jumps off the table. No amount of whistling or coaxing, or startling announcement of "rats" or even "cats" will induce him to keep still for one second. Half a dozen plates in succession are spoiled, until he takes it into his intelligent head to go to sleep, when a good photograph is at last secured, and the lady, with many apologies for having given so much trouble, bows herself out. She is succeeded by two young gentlemen just returned from school, who, beyond making each other laugh, putting themselves into absurdly grotesque positions while the operator is attempting to focus, and asserting that "it's no end of fun being photographed" (which the obtuse operator doesn't seem to see), conduct themselves tolerably well, and in a few minutes are dismissed. The next visitor is a young mamma with her infant. "Do you think you can take a good likeness of this child?" she inquires; "she has just learned to walk, and I should like her to be taken standing."

"But she has only just learned to walk," suggests the artist, "I don't think she will be able to stand still."

"Oh yes, I am sure she will," returns mamma. "*Do*, please try; I should *so* like to have it."

The artist cannot withstand this appeal, and against his better judgment, attempts and fails; for the sweet little cherub is unsteady on its "pins," and is much given to "flopping" at unseasonable times. Mamma is at length compelled to do what the artist recommended in the first place— to take the baby on her lap.

Then there is the deaf old gentleman, who can't hear when he is told to keep still; and the communicative young lady; and the funny person, who wants to be taken with his fiancée, and when he has moved talks about missing his face, and facing his miss, and tells the operator he may fire away again, he has lots of time.

It is now about four o'clock, and the artist, who has in the course of the day travelled about twenty miles, in rushing in and out of the developing-room, arranging sitters' dresses and accessories, regulating the light, &c., with the thermometer standing up amongst the nineties, has not had an opportunity of taking any refreshment, or sitting down for one minute. Yet he is expected to be polite and conciliatory to all, never to lose his temper, and must attempt, at least, to strike up a cheerful conversation with each sitter, so as to get an "expression."

Can you understand, then, that some of us who live in glass houses do occasionally desire to express our impatience by some strong demonstration?

PHOTOGRAPHY AMONG THE ALPINE PASSES OF SWITZERLAND AND ITALY.

At the last meeting of the North London Photographic Association, Mr. Stephen Thompson read an interesting paper

on this subject, in which he detailed his experiences of the varied conditions of light, temperature, &c., in the scenes he had recently photographed. He remarked that the mode of working adopted by the very reduced band of professional landscape photographers, was very much alike, except in minor details, which, though interesting to the curious, in no way accounted for the distinctive excellences in the pictures of each—that feature residing in the idiosyncracies of the workers themselves; and that the teaching and iterated enunciation of the above principles, by both the leading journals, had now quite dispelled the illusion that successful photography depended upon anything else than devoted labour, large experience, and natural aptitude for this particular pursuit. And that, furthermore, the practice of photography abroad—allowing for differences of temperature—was pretty much the same in its conditions of success as photography at home, with perhaps this difference, "that while out-door photography, if pursued systematically, and not spasmodically, is always hard work, photography among the Alps is hard work intensified."

As the facilities of travelling and the cosmopolitan habits of our countrymen have rendered this tourist-ground so well known, Mr. Thompson eliminated all those incidents of travel that had not some photographic bearing or relation, and confined himself to the exhibition of the photographs before referred to, and the relation of their difficulties on the one hand, and their natural aids on the other. Among the difficulties enumerated was the old well-known malady, "pin-holes," which he found often gave way to the simple treatment of adding crystals of nitrate of silver to the bath. Another difficulty was the frequent custom-house examinations on the Swiss-Italian frontier, which are very tiresome and dangerous to people travelling with photographic baggage. The examinations frequently take place while travelling in the night, when both examiners and examinees are half asleep. In Italy they sometimes levy a duty on the negatives *as* "*glass*," and glass only, the duty being absurdly small, but the danger to the negatives *not so*.

Another source of difficulty was the sudden mists in some of the higher passes, the mists ascending from below with great rapidity, attended with great cold and even danger, as they left the disappointed photographer to grope his way home with his guide in the best way he could. The other extreme of heat was not infrequent, and the hot wind, known as the sirocco, coming from the plains of Italy, attended with clouds of dust and flies, would prevail for several days together in some of the passes, such as the St. Gothard, forming an insuperable difficulty during its continuance.

Among the "natural aids" Mr. Thompson places the colour of the water of the Swiss and Italian lakes. The weakness of photography in its representation of water is one which painters have not failed to enlarge upon. Excepting in Mr. Wilson's and Mr. Blanchard's small stereoscopic pictures, the sparkle, the transparent and inexpressible beauty of living water is seldom seen. A dull, opaque, lifeless blank of white paper is a but too common representation of water. Pictures with a foreground of water should always be taken as much against the light as possible, as the shadows have then a depth and intensity which goes far to equalize the illumination, and the water is not then done out and lost before the remainder of the subject has duly impressed its image on the sensitive plate. The colour of the Swiss lakes being of the brightest and most positive green, is of course a "natural aid" to its photographic representation.

Mr. Thompson appears to think Switzerland a land extremely favourable to the peculiar conditions required for the production of pictures by photography. In his own words, which we subjoin, "Switzerland is, on the whole, the land, *par excellence*, for photography, being peculiarly adapted for its practice and its conditions—far more so than Italy. Picturesque foregrounds and picturesque adjuncts abound almost everywhere for those who know how to use them. Picturesque chalets, picturesque waterfalls, crag, rock, and boulder are numerous enough, and in some of the mountain passes cascades are as plentiful as blackberries. Other natural aids are the abundance of water everywhere at hand, and the absence of those health-giving breezes which are so unremitting in their attentions at home, and which form, alas! one of the photographer's greatest and most implacable foes; not that the wind never blows there, but rather that, from the natural formation of the country, the way in which the trees, when there are any, compose themselves in relation to the rest of the landscape is such that wind is seldom or never so fatal in its results as amidst English scenery. Then the indescribable varieties of cloud-form and cloud-beauty! Wonderful it is to see them in the morning, perhaps far below you, creeping from pine to pine, rallying in the ravines, loitering here and floating upward there, until at noon you see them lie couched in majestic masses above the peaks of the loftiest mountains. And, what is more to the purpose, they are very easily photographed: the merest trifle of under-exposure, and the clouds are as well defined as the rest of the subject on the negative plate.

"The composition of photographic pictures is much more difficult among the Swiss-Italian lakes. Those picturesque towers, vine-clad trellisses, and bits of ruined architecture, of which one sees chromo-lithographs in every shop window, are not to be found as photography must find them to do any good with them. They are all to be seen there, but rarely in combination—never, almost, as these splendid materials for pictures are combined in drawings. The greatest charm of Italian scenery partakes more of colour than of form, and is, therefore, just that in which photography is weakest. Another difficulty, if it may be called so—is the excessive heat, which is sometimes very great. Life in some of the crazy old-Italian towns appears to be all 'beer and skittles,' in the form of cards, dominoes, and *vino*, and the *dolce far niente* the only thing lived for—literally

> 'A land
> In which it seemeth always afternoon.'

After breakfasting under the shade of olive trees, with clustering grapes and green figs hanging all around you, and beneath your feet green lizards—beautiful little creatures—playing in the grass, the soft calm air of such a clime is not particularly provocative of exertion."

* * * * * *

In conclusion, Mr. Thompson gave a brief description of the incidents attending a day's photographing in the High Alps.

"It has been my lot to set up a camera in many strange and beautiful places, ranging from the Grampians to the plains of Lombardy, but I know nothing more enjoyable or so beautiful as the combinations of scenery which present themselves during a day's photographing among the Alps. You rise from a sleeping-room which seemed over night very much like going to bed among the stage scenery of Covent Garden or Drury Lane. Through the grey twilight may be descried signs which guarantee a fine day. Your guide straps on your tent while you finish your milk porridge or bread and honey, and the quiet glory of a summer morn flashing up amongst snowy peaks and vine-clad hills finds you far on your way. We get perhaps a long stretch of jagged precipice on the right; before us a mountain which blots out half the sky; and yonder, winding like a dark thread, is the onward path which shall lift us to the view we want. How near it seems, yet how far; for the forenoon will be well advanced before our little white tent will add another speck to the herd of goats we see grazing there. Presently the sun tops the peaks on our left, and its rays come blazing down with almost tropical heat. Our guide stops to doff all but his nether garments and coarse home-spun shirt. Another half-hour's tramp over the dewy but fast-exhaling grass, and the zig-zag terraces which the Swiss are so fond of making, and which, though they appear a very roundabout way to an impetuous man, are, no doubt, by husbanding the strength, an escape from loss of breath and exhaustion, and subsequent breakdown."

"*Wollen sie etwas wasser haben*," inquires the guide, which is a hint suggestive of a halt. I decline any water, but add a dash of *kirchwasser* to his, and, after a short rest, again push on, for the sun may serve us an ugly trick. Not that he will take French leave—the clouds are too high for that—but in Alpine regions he has a way of hiding himself behind some peak, leaving you in a well of gloom as early as three o'clock in the day, though you know he is shining brightly on the plains below; thus sometimes, practically, the sun has set to you soon after noon. So we push on, and ere long our tent has reared its modest structure where nature remains in a very unsophisticated state; and glorious beyond measure is the view before us. How shall I describe it? You sit down, you fidget, and get up, and sit down again, and finally get to work. Luncheon passes in haymaking fashion, and fortunate are you if you can find temporary shelter from the scorching noon-day sun. Thus time wears on, and when the long, long day is closing, your negatives are boxed, the tent repacked and strapped on the brawny shoulders of your guide—the last glass of *vino*, or German beer shared, and the bottle shied over some precipice where not

even the echo of its fall ever reaches the ear—you light your cigarette, grasp your alpenstock, and away homewards, while every mountain peak is blazing a farewell to the dying day! Away past that awkward chasm, past the little desolate lake, past the rude cross, and the diminutive oratory on the other side of the hill, with its tinselled images, tawdry finery, and vulgar, blear-eyed, red-lipped daub of the Virgin. It looked anything but romantic this morning, but the darkening twilight has invested it with a mysterious, half-poetic aspect not its own. Still on! how silent it is! yet everywhere the noise of falling water; and ere you reach your temporary home the twilight has given place to the majesty of night, and yet another beautiful sight is yours."

Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting of this society was held in Myddelton Hall, on the evening of November 23rd, Mr. G. Dawson in the chair.

The minutes of a former meeting having been read and confirmed, Mr. A. J. Melhuish and Mr. Beasley were elected members of the society.

The Chairman exhibited some new stereographs of interiors and other subjects, by Mr. Wilson.

Some specimens of frames, mounts, &c., for photographs, of German manufacture, were sent for the inspection of members, by Messrs. Beckman Brothers.

Mr. Stephen Thompson then read a paper entitled, "Photography in the Alpine Passes of Switzerland and Italy" (see p. 582). During the reading of the paper, Mr. Thompson exhibited a number of very charming photographs, 7 by 5, and stereoscopic size. They were especially distinguished by delicacy, brilliancy, and the perfect rendering of atmospheric effect, and of what may be termed "texture" in water.

In answer to a question, Mr. Thompson stated that the 7 by 5 views were by Dallmeyer's No. 1 Triple, and the stereo views by a pair of single lenses, short focus, by Ross.

Mr. Moens asked if the exposures were long or short.

Mr. Thompson said they varied according to circumstances, but on the whole he had not found much difference in this respect between Switzerland and England. Objects generally were, however, more equally lighted, which enabled him to obtain well-exposed foregrounds whilst he secured clouds.

The Chairman said he noticed that Mr. Thompson had adopted the principle of taking the view almost against the light. This was a plan much followed by Mr. Wilson, and it seemed to be coming recognized as necessary in order to delineate water well. In these pictures the water was very well rendered.

Mr. Thompson acquiesced. He said:—The colour of the water in these scenes was moreover admirably adapted to aid the photographer. Lago Maggiore, for instance, was of that peculiar bluish green colour which made it tolerably easy to render. In answer to Mr. Simpson, Mr. Thompson added that in several instances the camera was slightly above the water, which also aided in securing the proper and transparent rendering.

A conversation on the character of Italian landscape followed, which was described as abounding in picturesque bits, but they were not composed in nature so as to form in photographic pictures, such as the paintings and coloured lithographs exhibited in this country as Italian scenery.

Mr. Moens, referring to the annoyances of examination of negatives, &c., by custom officers, stated that he had procured from the Italian Ambassador, in London, an order permitting his luggage, apparatus, &c., without examination.

A conversation on the specimens followed, which showed one a thick mist very rapidly rising, which would speedily envelop everything, especially exciting attention. A similar phenomenon, the Chairman remarked, was not uncommon in the Highlands of Scotland.

Mr. Cole referred to a peculiarity which rendered Italian landscape less easy to photograph than that of Switzerland. He referred to the flickering character of the light. Macpherson, Alinari, and others had found that difficulty.

Mr. Thompson said this was so. Moreover, the peculiar tenderness of colour, less gorgeous and striking perhaps than colour in this country, made photographs fall far short of depicting the scenes.

Mr. Moens, refering to the same subject, said he once asked an Italian photographer why he did not try to secure skies in his pictures. The reply was, "You Englishmen are always trying to do something you cannot effect. I don't try because it is impossible; but content myself with getting good photographs, without trying to get skies."

In answer to Mr. Hughes, after some further conversation, Mr. Thompson said he did not find exposures much different to those required in England. In Switzerland, the light was better than here, but not in Italy.

Mr. Moens said, in his experience, the amount of actinism in relation to apparent light, grew less as he travelled eastward. In the Crimea, for instance, with more apparent light, there was less actinism.

After some further conversation, and a vote of thanks to Mr. Thompson,

The Chairman exhibited some negatives sent by Major Russell as examples of "blurring." They were exaggerated he said, in order to show that the defect was due to light passing through the film, which was then reflected back again.

Mr. Foxlee asked if ground glass had been tried to prevent it.

The Chairman said it had been tried, but did not entirely remove it without paint as well. Besides, it would interfere with printing.

Mr. Hill had worked many dry plates, and had looked through his negatives, but could not find a trace of blurring in any of them.

Mr. King had been troubled with it grievously during the past summer.

After some further conversation,

Mr. Wharton Simpson said the negatives were interesting specimens of a defect doubtless produced by the causes described; but they were in no sense that he could understand examples of "blurring." The images were certainly not blurred in the usual sense of the word, nor in the sense which he had always heard the word used photographically. Portions of the plate were fogged by the action of light, and that light no doubt was reflected from the back of the plate. But this fogging by the presence of light where it was not wanted was not blurring. This defect had been named by Mr. Shadbolt *nubation*, and possibly it was the best word to express the thing.

Mr. Skeley asked if the light which sometimes surrounded a window in an interior were blurring.

Mr. Simpson said no, that was doubtless from this cause, and was what Mr. Shadbolt called nubation.

The Chairman said that perhaps the word blurring did not well describe the effect in question, but since it had already been applied to it, he thought they had better stick to it.

Mr. Jabez Hughes said that having been much engaged recently in working tannin plates, he had examined his pictures to ascertain if he could discover any sign of this blurring which had been under discussion lately. He thought that he ought to have had it, but he saw no sign of such a thing in any of his plates. He came up to London, and brought up some specimens to show to his friend Mr. Simpson, who found no blurring. He then saw Major Russell, and soon found that this had been a discussion about words rather than phenomena, the whole arising out of a confusion of terms. He thought he knew what the word blurring meant. He knew how he could produce a blurred print. He knew blurring in prints produced by moving the paper slightly in the pressure frame during the time of printing. He knew what was a blurred image in the negative, arising from touching the camera during the time of exposure. He knew the blurring produced by the movement of the branch of a tree by the wind. He knew the blurred image that would be produced by a slight movement of the paper in producing a print from a lithographic stone. The word blurring had a distinct English meaning in all these cases, the fine lines and fine definition of the image was injured, they were blurred. But in the negatives before them they had a peculiar kind of fog, disguised under the term of blurring. He must enter his protest against the use of the word to indicate the phenomenon in question. Had another, and more descriptive term been used, photographers would not have been misled. The image in the case in question was not blurred; it was merely rendered fainter, its vigour degraded by the action of light. They had blurring enough from other causes, but the term was altogether inapplicable

here. There were various phenomena in photography having resemblance to the spreading of light, but for this distinct effect a new word had been proposed, because a definite name had not been given to it. Possibly the term *nubation* would serve the purpose as well as any. Mr. Hughes then proceeded to describe the difference between his own method of working the tannin process, and that of Major Russell. The latter gentleman, in aiming at great sensitiveness, worked with very thin and transparent films, whilst he (Mr. Hughes) worked with dense and creamy films. The latter did not readily allow the light to pass through, but the thin films did, and with certain subjects and long exposures this fogged effect from reflected light was produced. If Major Russell had discovered something which would remove this defect in the conditions where it occurred, he had done good service; but they must avoid, in order to let that service be available to photographers, the use of an ambiguous and misleading word.

Mr. King said that Mr. Hughes' explanation of this effect as a result of thin films was confirmed by his own experience. He had been unable to account for its appearance so much in his negatives this last summer, whilst formerly they were quite free from it. He now saw the cause in the thin film he had recently used. He agreed as to the importance of a term, but he confessed he did not like the term nubation.

The Chairman said he did not like Mr. Hughes' term.

Mr. Hughes said the term was not his; he had merely used it because it was already suggested, and seemed to express the idea.

The Chairman said *halation* was perhaps a better term, which meant a secondary illumination round a luminous body.

Mr. Hughes thought that in this case, it was just the opposite effect.

Mr. Simpson said the use of the term halation would only make still greater confusion, as that term was already appropriated to indicate a definite phenomenon. It was through the misuse of the term *halation*, that Mr Marlow's paper received so little attention some years ago. Photographers understood by halation a definite thing, consisting of a line of light between a dark body and a lighter body, as for instance, in a portrait, between a black coat and a grey background. Therefore when Mr. Marlow brought forward his reflection theory to account for halation, they felt that his explanation had no connection with the subject of which they were thinking. The term *nubation* was suggested by Mr. Shadbolt, or rather perhaps by Mr. Bohn, and adopted by Mr. Shadbolt, as best expressing the thing to which Mr. Marlow referred, and to which it now appeared Major Russell had been referring as blurring.

A general conversational discussion followed, in which various terms were proposed, such as "fogging by reflection," "reflection," "overlapping," "irradiation" &c., but nothing was decided.

Mr. Hislop, thought that in the use of a dense film they had a very sufficient remedy, without painting the back of the plate, &c, and they need therefore scarcely trouble themselves about the matter. Mr. Hill had never been troubled with it, and he had never had it at all in his negatives. The dense film gave the best pictures, and removed all these troubles at the same time.

Mr. Hughes said, there were cases nevertheless, when with any film, it would occur, such as long exposures, with dark objects against a mass of sky.

Mr. Coles said, that in his work he used dry plates, and generally had subjects with a great deal of sky, sometimes a spire cutting into a mass of sky; but he never met with this defect. He thought that dry blotting paper pressed firmly against the back of the plate was sufficient ta prevent it, without using a pigment.

Some further discussion on sheltering the lens from the action of a mass of sky followed, and on the use of terms, after which the subject dropped.

The Chairman then showed some fine examples of photographs printed on opal glass, by Mr. Wenderoth, of Phildelphia; the pictures were produced by using albumen on glass, and then working as with paper, they were styled Tooveytypes.

After some conversation on the subject, in which the Chairman said the chief difficulty arose from the perfect character of the opal glass in this country, which was not flat. The printing and toning were easy.

M. Lonsdale showed some examples which he had found it was almost impossible to tone.

Mr. Hughes thought that the method with chloride of silver in collodion, recently proposed by Mr. Simpson, would probably give better results than albumen.

Some further conversation on the subject followed, in which the Chairman, Mr. Seeley, Mr. Foxlee and Mr. Lonsdale took part.

The Chairman then called attention to a very good enlargement he had just received from Dr. Van Monckhoven, produced from an ordinary negative by Southwell Brothers.

A paper by Mr. W. Warwick King was announced for the December meeting, on "Neglected Art Fields for Photographers."—The proceedings then terminated.

The American Photographical Society.*

Special Meeting.

The evening of Monday, October 17th, will long be remembered by those members of the American Photographical Society who attended the special meeting, called at the rooms of Vice-president Bogardus, for the purpose of listening to an address by John W. Osborne, of London, a gentleman who holds a high position in the profession, and undoubtedly ranks first among photo-lithographers. After being introduced by Professor Joy,

Mr. Osborne gave a very interesting history of the invention and improvements of his most interesting process of photo-lithography. In 1859, while connected with the civil engineering department of the government at Victoria, Australia, he saw great necessity for a more rapid method of reducing the thousands of maps which were coming in from engineers in the field. These maps were drawn upon a large scale, and therefore it was necessary that the size should be greatly reduced before they were published for sale and distribution. This reduction required the constant labour of many draughtsmen, and was attended with great expense.

In September, 1859, he had so far perfected his process, as ot entirely supersede the reduction by hand, and at the cost of about five per cent. of the expense necessary for reducing by the old method. The reduction of maps which were very full of detail, requiring the careful labour of a draughtsman for many days, were by his process reduced in a less number of hours. Mr. Osborne's knowledge of photographic chemistry had led him to pursue an entirely different course of investigation from those who had preceded him in photo-lithographic experiments. Others had worked by sensitizing the lithographic stone, upon which to impress the image direct from the lens of the camera, or from the previously prepared negative.

Mr. Osborne sought for such an impression upon paper as would admit of being transferred to stone, and printed in the ordinary way. The triumphant success with which his efforts have been rewarded, were amply attested by the beautifully perfect productions which he exhibited to the members present. Among the collection was a series of large experiments in black and colour, now being published by the Prussian Government, to illustrate the report of the late expedition sent out by that Government to Japan and Siam. The negatives direct from the drawings of the artist who accompanied the expedition, and the transfers upon stone were made under the personal superintendence of Mr. Osborne, during his recent residence in the city of Berlin, where he had removed for greater facilities and more artistic associations than in Victoria or Loudon. Mr. Osborne's process opens to the artist an almost boundless field, as by it, his works can be reproduced, not only with absolute fidelity, but at a price so low, as to give a wide circulation, instead of confining them to those only who are able to possess originals.

In the collection which Mr. Osborne exhibited were several copies from engravings by some of the most celebrated old masters. So perfectly was every line reproduced, that it must be acknowledged the copies possessed all the intrinsic value of originals. Many copies from pen-and-ink sketches exhibited the important feature of the process, in retaining the style and feeling with which the artist endows his work.

During the evening, Mr. Osborne gave the details of his process, which have already appeared in our pages.

Before adjournment, a unanimous vote of the thanks of the Association was tendered to Mr. Osborne for his valuable address before the members.

Mr. Osborne is now on a visit to the United States, for the purpose of introducisg his invention to publishers and the profession, and should meet the cordial reception to which he is pre-eminently entitled, and which Americans are ever ready to accord to science and art.

* From *Humphrey's Journal*.

Correspondence.

REGISTRATION OF CAMEO PORTRAITS.

Sir,—There seems to be considerable misapprehension amongst photographers as to what can be secured under the Act for copyright of ornamental designs, particularly in relation as to how far Messrs. Window and Bridges, by their registered cameos, secure the right (or otherwise) of embossing photographs; and as we have given some attention to the subject, and have introduced the embossing for our own medallion pictures, samples of which are in the hands of photographers from one end of the land to the other, on our Christmas cards, we should be obliged for a little space in your journal, to give our brethren in the art the information we possess.

As soon as we saw Messrs. W. and B.'s embossed cameo, we saw that it was applicable to other portraits than their cameos, and made application, through an agent, for a copy of the registration, asking the question, "Is the diamond form or the embossed pictures the special portion of the design registered?" and the reply from the Registrar was as follows:—

"1, *Whitehall, 15th October*, 1864.

"Sir,—I am directed by the Registrar to acknowledge the receipt of your letter of yesterday's date, together with the sum of 2s. and a card for photographs, for which you require search. I now enclose you search certificate No. 1287, and it appears a similar card, with the exception of the photograph, was registered in class iv.; in so far as regards its ornamental character, but with respect to the arrangement of the photographs in a diamond form, or the convex form of the card in the places where the photographs or medallions are intended to be fixed, being registered, the Registrar is unable to give any information.—I am, sir, your obedient servant, H. C. Woolett."

This, with the advice of the agent, that no general application can be secured by registration, made us feel that we were quite at liberty to emboss photographs, so that we did not copy the design of Messrs. Window and Bridges. In Newton and Sons' abstract of the laws relating to the copyright of ornamental designs, which may be had for 6d., they say, "It should be borne in mind that in no case will *construction* be secured under this Act, as it is merely intended for the protection of ornamental devices and patterns, such as calico prints," &c., &c.

Thus the matter rested till a few weeks later, when something turned up which will set at rest the mind of the most nervous photographer.

Our own embossing tool wanted some little alteration, and taking it to a different workman, he told us we were infringing a patent. We inquired whose, and they gave us Messrs. Marrion and Son's card as the patentee; we searched in our public patent library and could find no trace of such, either old or new. We then wrote to Messrs. Marrion and Co., asking if they had a patent, &c.: we made reference to Messrs. W. and B.'s registration, and sent them designs which were engraved eighteen months ago, and which we inclose to you. We received this reply from Messrs A. M. and Son who, as agents for W. and B., should know:—

"23, *Soho Square, London, November* 14, 1864.

"Gentlemen,—We should have replied to your mem. of the 11th inst. sooner, but your letter was addressed to Messrs. Marion and Co., of Regent Street. You can use the single and double designs, either flat or embossed, without infringing Messrs. Window and Bridge's right; you could also use the design for four, if not embossed, without infringement; if embossed, it would be an infringement.—We are, gentlemen, yours, &c. A. Marrion and Son.

"Messrs. Pumphrey Brothers,
21, Paradise Street, Birmingham."

This sets the matter of embossing entirely at rest, although we have the designs for four executed eighteen months ago, we find they are not so saleable like the single and double. We quite dissent from Messrs. Marrion's judgment in relation to the four. Our design will take four different persons selected from a dozen or more portraits, and have not photographic ground, being *quite different to the designs registered* by W. and B. We quite admire Messrs. W. B.'s registered card, and do not think them capable of much further improvement, and those who like to follow in their steps cannot object to conform to their terms, which are quite liberal; at the same time, it is not likely that the payment of a nominal fee (which is £1 in class iv.) can secure any general application, such as is granted by letters patent.—We are, respectfully, Pumphrey Bros.

21, *Paradise Street, Birmingham, November 20th.*

[From recent inquiry as to the extent of the protection obtained by the registration of Messrs. Window and Bridge, we ascertain that it is confined to the design in its complete form, which they have designated the "Diamond Cameo," that is, four convex oval discs arranged in diamond or lozenge form. The arrangement without the convexity is not protected, nor the convexity without the arrangement. Each, separately, is open to the public.—Ed.]

MAGNESIUM LIGHT FOR PRINTS.

Sir,—In using the magnesium light for the purpose of taking portraits, your correspondent "G. W. O." and others should remember that a definite quantity of the metal must be burned in order to obtain a certain result. If, for instance, a number 1 B Dallmeyer lens is used to take a vignette carte, I find that the best effect is obtained by burning about twenty grains of the metal at six or eight feet distance from the sitter, and this, if burned in one strand of the wires of the ordinary thickness, 12 in. long, it will take from 40 seconds to one minute to obtain the negative, that is to say, the wires will burn about that time, and if the sitter has remained still, the negative will be a good one. It is quite useless to expect a negative unless the proper quantity of wire has been used. If the strand is cut into two parts of six inches each, and ignited at the same time, they will burn about thirty seconds, but this plan I do not recommend, as the light is not so completely under control.

The kind of burner which I used at the Royal Institution is the one I have found most useful and efficient, and this, with some improvements, is now manufactured by Messrs. Mather and Platt, and may be obtained from Messrs. Johnson and Mathey, of Hatton Garden, for a few shillings. This burner is *not patented*, and for that reason, I suppose, can be sold at so moderate a price.

The advantages of the burner are, that it affords a complete shield for the light, it can be moved in any direction required, so as to illuminate every part of the figure or object to be copied, the light and shade being completely under control. If desired, a plain mirror may be used at the back as a reflector, but for portraits this is not required. The light is so completely screened from the lens that the burner may be moved in all positions, rendering it unnecessary to burn a second portion of the wire on the shade side.

I inclose few portraits taken lately, most of them after dark, but some of them during foggy weather,

Yours truly, A. Brothers.

[Mr. Brothers forwards us some cards, which admirably illustrate the possibility of securing well-lighted pictures by the magnesium flame, and also its especial value in eking out bad daylight.—Ed.]

ENAMELLED PHOTOGRAPHIC PATENTS.—APPLICATION OF COLLODION TO PAPER.

"Assuming the conclusion just referred to as to the permanence of prints coated with collodion to be borne out, it is a fact of interest and importance."—Mr. Wharton Simpson, at South London Meeting, Photographic News, Nov. 18th.

Sir,—Notwithstanding Mr. Rollason's patent for enamelling photographs, I believe I am the first person who described, in the Photographic News, Sept. 4th, 1863, the *modes operanda*, by which the surface of a photographic or other print could be covered with an enamelled waterproof coating of collodion, and

in the issue of April 22nd, 1864, I mentioned that I used collodion films on paper for photo printing, which will eventually lead the way to the manufacture of a special article of paper pulp, in combination with collodion and the salts of uranium and silver, as the best suited for a permanent printing process.

In the issue of the News for Oct. 21st, Mr. Rollason states that he regrets to find that when a new process is practically brought before photography, tending as this does to their own advantage, that there should be found those who will insist upon looking the gift horse in the mouth, and why not? This is exactly what photographers in their own interest should do, in order to ascertain the ownership of the horse in question: and if he be public or private property, for my part, I will ride him when I like, and my reasons for so doing are as follows:—

Having procured the specification of patent No 2249, and dated 1860, and after having carefully perused it from end to end, I could not find in the whole publication, the word photography or enamelled photograph; and therefore, I concluded I had obtained the wrong specification, at least, a specification of patent that in no way applied to the enamelling of a photograph, in the way in which it is practically done, and described by me, as stated above. I am willing to admit, that you will find in it, many extraordinary applications of pyroxyline in combination with animal, mineral, and vegetable substances, for the production of various articles of domestic use, such as buttons, cups, tubes, boots and shoes, hat bodies, jewellery, picture frames, engraving, gunpowder, bricks, and numerous other articles, a list of which, would encumber this communication; in fact, a person would be inclined to believe the compiler had consulted a dictionary of the arts, of a date previous to the invention of photography.

Mr. Rollason is not the only claimant to this useful invention having seen it in several newspapers claimed by the advertisers, one of which I inclose, taken from the *Freeman's Journal* of this day, headed—

"Startling Novelty in Photography, secured by Royal Letters Patent.—Enamelled Vignettes, &c., &c. Complete stability and brilliancy of color, for if they are immersed under water for twelve months, they will not fade or be impaired, in delicate detail or permanency; the surface being enamelled equal to the finest polished glass." This 'Banaghers' the Wothly or any other type.—Yours respectfully, Francis S. Beatty.

Dublin, 29th November, 1864.

[Mr. Beatty gave clearly detailed instructions for the application of collodion to the face of the collodion print in his letter of September twelvemonths; but this was not the first publication in September 1860, p. 262, vol. iv. Photographic News, Herr Liesegang described the same process.—Ed.]

Photographic Notes and Queries.

Artificial Light for Enlarging.

Sir,—I have tried enlarging with the solar camera and magnesium wire, and find with the ordinary run of negatives one has to make enlargements from, it would cost over 5*s.* to get any result on the most sensitive iodized paper I can prepare. I am aware that excessively thin negatives should be used, but as enlargements are generally required from negatives of deceased persons, or from such as are used for ordinary printing purposes, the use of magnesium wire becomes quite out of the question.

Could you inform me whether the cost of setting up the electric light, and the expense of burning it would make it available for enlarging.

What do you think of the lime light for the purpose?

My object is to get a light that would not cost more than a shilling for 18×24 pictures from carte size negatives.

I shall be very grateful for any advice you can give me.—Yours, &c. Artificial Light.

November 28th, 1864.

[Can any of our readers who have had practical experience in this direction assist our correspondent?—Ed.]

Varnishes and Powder Colours.

Sir,—Will you oblige me with a formula for a preparation which could be applied to paper photographs (cartes, &c.), so as to render them fit for receiving *powder colours*. Also let me have a formula for making a varnish to apply to the above, after colouring, and one that will not lower the tone of the whites. Please also oblige me with a formula to apply to glass positives, which will bite the powder colours well, and one that will not lower the tones in the picture. I have bought several preparations and varnishes for the above purposes, but they are not satisfactory; I would rather, therefore, prepare such myself, if I had the necessary formulæ or recipes to go by. Please oblige me with them in the correspondents' column in your next issue.

Feeling sorry to trouble you in the matter, I am sir, yours very respectfully, Silver Pen.

[A moment's reflection will convince our correspondent that he hopes for a very improbable thing. He has purchased many preparations for a given purpose, manufactured by persons whose profession or trade it is to deal with the materials in question, but they are not so perfect as he desires, and he thinks that, aided by recipes from us, he can, without experience, manufacture better varnishes than those of all professional varnish makers. All varnishes will lower the whites in greater or less degree, but if they contain but little of the resin they will do so in a minor degree. We will answer the questions as far as our limited space will permit.

To prepare paper pictures for receiving powder colours some sizing preparation which will give the surface a tooth is necessary. It may consist of a very dilute solution of isinglass, or of a thin varnish, like "Newman's Positive Colouring Varnish." After colouring with powder colours, which to manage well requires some skill and experience, varnish with a spirit varnish of good body.

For glass positives you can purchase better varnish than you can make, but the best you can make will be solution of mastic or dammar in benzole.—Ed.]

Talk in the Studio.

London Photographic Society.—At the meeting next Tuesday evening, Mr. Jabez Hughes will read a paper on the Tannin Process, and Mr. H. Cooper will read a paper on the Wothlytype Process. Both papers will be illustrated with specimens.

The Wothlytype Process.—In all the studio talk which we hear, a general feeling of disappointment is expressed that the Wothlytype patent did not embody some new scientific fact of photographic interest. Admitting the novelty of the combination of nitrate of uranium, and nitrate of silver in collodion, it is urged that such a combination involves no discovery, everybody knew it could be done. Some, indignant at being deluded into a belief that silver was entirely dispensed with, denounce the whole thing as unworthy of attention, having no single advantage over ordinary silver printing. Others believe that it contains many points of excellence well worthy of attention, especially in regard to the promise of permanency. But all seem agreed that it will not supersede the ordinary silver printing process at present, and that all interested in the preparation of albumenized paper may be reassured that their occupation is not gone. The worst rumour on the subject is to the effect that Herr Wothly states, that the process indicated in the published specification is not his process. If this be true, what explanations has he to make? Another ominous fact, which we regret to learn, has been brought under our attention. Mr. Dawson has submitted a portion of a print, entrusted to him for testing purposes, to the continued action of light for several days, covering up another portion, to compare the result. The result which we have seen is a very appreciable darkening of the sky, proving that it was sensitive to light. It would appear from this that the print had not been fixed, but merely washed; and would thus confirm the opinion we have repeatedly expressed, that the prints must be fixed. That upon which our testing experiments were made was fixed with sulphocyanide of ammonium. This at once explains the difference in the results obtained by ourselves and our contemporary.

Photographic Copies of Drawings.—At a recent meeting of the Society of Arts, the Secretary called attention to some photographic copies of engineers' drawings, lent by Mr. W. Willis, of Bath Street, Birmingham. By means of a photographic process, the details of which are not yet published, copies of drawings can be made rapidly and cheaply of the same size as the original. The original drawing is in no way injured by the process, and the copy is produced by simple superposition over the chemically prepared paper, and is a positive copy direct without the intervention of a negative.

THE DANGER OF PHOTOGRAPHING IN THE FIELDS.—A photographer of Cockermouth, was a few days ago, endeavonring to get a good view of the castle from the adjoining field, when he was suddenly knocked down from behind by a ferocious cow, which immediately commenced goring him. He seized the animal by the horns, regained his foet, and afterwards caught it by the nostrils with his finger and thumb, and held it while he looked around for a means of escape. He then started for the nearest hedge, but as he was in the act of clearing it, the cow caught his heel, and he fell over. He, however, fortunately escaped with a few bruises and torn clothes.

PUNCH'S SCIENTIFIC REGISTER.—*Punch*, in his last number, gives a record of the proceedings of scientific meetings. Here is his report of the meeting of the "*Photographic Society*:—The Lord Chief Baron in the chair. A paper was read on the Best Mode of Keeping Babies Still for the Photographic Sitting, and a debate ensued. Some unmarried members thought the best way was to frighten them by an awful shout at the moment of exposure; but the married members objected that maternal resistance to this course would probably be offered. Moreover, an ugly face was produced by terror. Chloroform was also suggested, and it was resolved that experiments should be tried with it A member said that if the mothers would only stay away, there would be no difficulty, as all babies were exactly alike, and a single type could be reproduced from an old picture. Thousands of photographs of the last Royal baby were sold which had never been taken from that princely infant. Mr. SNUBBER read a paper on the negative, as employed in answer to touts. Mr. POSER explained his process for photographing ladies who had large ugly hands. He tied their arms behind them, and placed beautifully modelled wax arms under the shawl or mantilla, with the hands exposed. This he considered legitimate idealization. It was stated that Mr. GLADSTONE, in his next budget, intends to impose a penny stamp upon every photograph sold, which will bring many thousands to the revenue without injuring any person. Mr. NOCULAR exhibited a fine photograph of the Milky Way after a storm, so exquisitely faithful, that the raindrops could be seen mixing with the milk."

To Correspondents.

IVORY.—You will find full details of silver printing on ivory in any article by Mr. S. Fry in vol. v. p. 171. Iron or uranium printing processes may also be used.

A. B.—We believe the best lens for enlarging is a No. 1 triple. But a good quarter-plate will answer very well to enlarge the amount you require.

D.—It is clear that you have not thought of the subject of binocular vision, or mastered the principles upon which it depends. If you close your left eye and look at an object with your right, you will obtain a certain view of the object. Then close the right eye and look with the left, and you will obtain another view very distinctly different. With the right eye you see a little more of the right side of the object, and with the left eye a little more of the left side. Now, in stereoscopic pictures, you require precisely the same conditions, a right eye and a left eye picture. If you mount two pictures from the same single negative on a stereoscopic slide, and look at them in the stereoscope, you will not get the effect of relief which arises from binocular vision. If, however, you wish to produce stereoscopic pictures with one lens, you can do so by employing a suitable camera, which will permit a movement so as to take the pictures from two positions representing the right and left eye. The lenses you name are, we believe, pretty good.

ST. DENNIS.—Pure recrystallized nitrate of silver should be white or colourless. 2. We prefer the saccharo-sulphate of iron as a developer for negatives.

A YOUNG BEGINNER.—Tannin plates must, of course, be dried in the dark, and be kept carefully from the light until exposure. 2. The time which a wet plate may be kept in good condition after it is taken from the bath will, of course, vary very much with circumstances, such as the quality of the collodion, the condition of the bath, the temperature, &c. Sometimes a plate may be kept an hour without much detriment.

STANLEY.—Possibly you do not leave the plate long enough in the bath. Remember, that in winter it is necessary to leave it much longer than in summer. Or, if you have not failed in this respect, try a small portion of the collodion with several more drops of water.

H. L., Hastings.—The specimen you inclose is very good. Should we hear of anything we will let you know.

B. P. M.—The "Silver Sunbeam" may be had of Mr. Atkinson, of Liverpool.

J. S.—We have no doubt whatever that the Wothlytype picture upon which we reported, giving details of the tests we applied, was chiefly formed of gold. In a deeply toned uranium print it is probable that the image consists almost entirely of gold, we have some before us now which we have reason to believe consist of gold only. The Wothlytype prints submitted to analysis by Dr. Schnauss were reported to contain no silver, but much gold. The constitution of the final image is, however, of less importance than the presence of silver in the whites of the print. This as yet cannot be eliminated from the albumenized silver prints, whilst in the uranium prints it is absent. It was to this we especially alluded in the remarks you mention. We think with you, however, that it is matter for regret that an impression was created to the effect that no silver was used in the process.

B. P. M.—You can use cotton wool in conjunction with vignette glasses, and by this means secure a less formal vignette. It is impossible to get uniformly good results with vignette glasses, as almost every picture requires a slight variation in vignetting to get good results.

G. G., W. H.—The defect to which you refer sometimes arises from the fault of the collodion, and sometimes from want of care in manipulating. Imperfectly cleaned plates will frequently cause it, especially if the plate has been slightly under-exposed and pushed in development or intensifying. The best remedy, besides avoiding these causes, is the application of a dilute solution of gum arabic or albumen to the film after fixing and washing and before drying. This will generally prevent the film splitting off and leaving the glass.

URANIUM.—Your question is really one for a lawyer. If you have a written agreement for a definite term, we presume that you can insist on the fulfilment of such engagement, or on the payment of some compensation. But you had better have legal advice.

H. STANLEY.—It appears to be an empyrical preparation. According to the analysis of Dr. Schnauss, it contained nitrate of silver, acetate of lead, and nitrate of lead. We have had no personal experience with it.

C. WRIGLEY.—The last edition of "Hardwich's Photographic Chemistry" is the Seventh. It is published by Churchill.

A PHOTO STUDENT.—We remember to have noticed, years ago, that some glass positives would remain in contact with the atmosphere without tarnish or discolouration for a long time, whilst others would spot and tarnish in a few days. We cannot state certainly the cause. It may arise from the different condition of the atmosphere at different times; or it may be from the character of the collodion. If we remember rightly a bright metallic looking picture, produced with a horny collodion, kept well, whilst a dead looking picture, taken with a powdery collodion, soon tarnished. Varnishing is the only real safeguard.

A. WINDOW.—You will find a recipe on page 394 of our last volume for a yellow varnish, which, applied to the window, will effectually prevent actinic light entering your dark room.

J. G.—In the PHOTOGRAPHIC NEWS for the 11th, you will find the specification of the Wothlytype process, and an article on the subject of uranium printing by ourselves. Add fifty grains of nitrate of uranium, and three or four grains of nitrate of silver, to one ounce of plain collodion. On adding the solution of nitrate of silver to the iodized collodion, you precipitated iodide of silver,

FRANCIS BONOMI.—We fear that iron spots are not peculiar to any especial sample of paper, as we occasionally hear of it in almost all samples. We have not heard of it as an especial fault of Hollingworth's; on the contrary, we have heard it praised for immunity from this fault; so we presume that you have met with an unfortunate sheet or unfortunate sample generally. We do not know of any remedy for such spots.

C. B. P.—The announcement that amateurs may use the Wothlytype process free of charge means, that they may learn as much about it as they can by any means in their power, and produce pictures to any extent; but it does not mean that the patentees will take any trouble to teach them. 2. Warming a toning bath generally renders its action more energetic for the time, but it is much more likely to be inert afterwards. 3. A toning bath, giving black tones, may be made with one grain of chloride of gold, one grain of chloride of lime, and six ounces of water. But a good negative and deep printing will also be necessary. 4. Boiling alone will not improve a bath, unless you get rid of the foreign matter. 5. The cost of producing a negative by the magnesium light will be somewhere near to one shilling.

+ AND —. Our experience with the electric light is not sufficient to help you efficiently. M. Darlot, if we remember rightly, is the successor to M. Jamin, whose lenses are easily obtained in this country.

T. P. E.—We fear that we cannot help you to a definite conclusion as to the impurity in your chloride of gold, nor can you probably remove it without reducing and redissolving it. The print which you inclose does not necessarily indicate impurity in the gold; it merely shows that the gold in the toning bath is ready to be reduced by the slightest disturbing cause. We have met with the pink colour all through the texture of the paper, from two or three causes. Toning in daylight is one cause, the paper containing free nitrate in its texture is another. We think it is very probable that by management of your toning bath and careful manipulation, your gold will work all right. We know of no method for getting rid of the fumes of chlorine in evaporating your chloride of gold, except working near a draught. Of course no one would dream of conducting such an operation in the glass house, and especially whilst sitters were present.

G. R.—Mr. Thomas's address is Pall Mall. We are obliged by your remarks on chloride of gold. Will you send us your address that we may write to you.

T. A.—We fear, after careful reflection, that the subject, whilst very interesting to ourselves, would scarcely be sufficiently so to the mass of our readers to justify us in asking you to proceed with the letters. In a journal of general science they would probably meet with more attention and appreciation. The alleged Spanish patents have been fully described in our pages.

HENRY REED.—There is no certain method known of restoring a faded photograph. Immersion in a bath of bichloride of mercury sometimes partially removes the yellowness of the whites; but it is not a certain cure.

Several Correspondents in our next.

LONGFELLOW'S HYPERION, ILLUSTRATED WITH PHOTOGRAPHS, received, and will be noticed in our next.

Several Articles and Letters are compelled to stand over for want of space.

Photographs Registered during the Past Week.

MR. E. T. CRAIG, 23, Bridge Gate, Rotherham,
Three Photographs (from Cast) of Muller's Head.

M. J. H. KAY, 57, Argyle Street, Glasgow,
Photograph of Rev. Dr. J. B. Johnstone, Glasgow.
Photograph of Rev. Inglis, Coatridge.

MR. WILLIAM BARTHOLOMEW, Egham, Surrey,
Two Photographs of Rev. S. B. Monsell, LL.D.

THE PHOTOGRAPHIC NEWS.

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THE WOTHLYTYPE PROCESS.

It has rarely been the fate of any photographic process to be ushered into publicity surrounded by so many unpropitious circumstances as have environed the advent of the process of printing which has been designated Wothlytype. It was not enough that in its primary details it awakened the natural antagonism of vested interests, and aroused the conservatism which makes us rather bear the ills we have than rush to those we know not of, as any method which threatens to revolutionise an existing system cannot fail to do; but in addition to this, it was announced as a secret and a patented process, and thus further excited the jealousy of photographers. It was rumoured, moreover, that Herr Wothly was a gentleman distinguished rather by zeal in selling secret processes than in promoting science or art, and that he had already sold secrets in uranium printing, which on trial turned out to be worthless. In addition to these things, specimens promised to the public were not forthcoming, and the first announced licence arrangements were of a kind peculiarly offensive to photographers, a circumstance which tended to increase the feeling of distrust and jealousy with which the new system was beginning to be regarded.

The one circumstance which at first stood against all this was the undeniable excellence of the prints exhibited. The promise of a process which professed permanency and did give such good results was so desirable that we, disregarding the various rumours and other antagonisms, resolved to give every chance which a fair field and full examination could afford to the process. We availed ourselves of the first opportunity of testing a print, and recorded the results just as we found them. The conclusion was one very favourable to the permanency of the prints, but there were drawbacks in the value of the test which, if we did not dwell upon, we could not overlook. We did not see the print upon which we experimented produced, nor did we know its history; and we received no print at the time, and only a portion of one since, for private test. Since then a contemporary records a series of experiments with one of the prints supplied to him, which are much less favourable to the claims of permanency, and on exposing a portion of the sky to the continued action of light, a very apparent darkening of the paper showed that this was not even a fixed print! That upon which our tests were applied was, as we subsequently learned, fixed in sulpho-cyanide of ammonium, and gave, as we stated, promise of greater permanency than an albumenized silver print.

Next came the discovery that, in the face of the general statements in non-scientific journals as to silver having been abandoned, the source of the image in the new process was nitrate of silver after all. It mattered not that the proportion of silver was infinitessimally small, it was there, and professional photographers, amateurs, manufacturers of albumenized paper, and journalists, at once set up a shout of derision, to the effect that "it wasn't new, and it wasn't true, and it didn't signify."

All this was very natural, whether it was very wise or not. For our own part, desiring only the progress of photography, having no vested interests to serve, and no conservative scruples to overcome, we heard with pain and regret each rumour, each disclosure, which militated against the value of what had promised to be such a valuable boon to the art. We heard the Association condemned in various terms for their part in the matter. We believed its directors to be, however, as we now believe them, honourable gentlemen and truthful men; and whilst we saw that they had been placed, by their position as patentees, under the necessity of silence, which appeared to give tacit sanction to the mis-statements as to the absence of silver in the process, we never doubted their good faith, although we could not but admit that they had blundered somewhat, and lacked some of that business tact which is only to be obtained by experience in business. But another rumour, of a much more formidable character, now assumes a definite shape, and admits of a definite answer. We can readily believe that the gentlemen concerned have not felt themselves at liberty to deal with or answer general rumours or vague dissatisfactions; but a public statement has now been made which the directors of the Association are bound, for their own honour's sake, and for the prosperity of the Association, to answer, M. Ernest Lacan, Editor of *Le Moniteur de la Photographie*, says in his last issue, after giving some extracts from the English specification, that in reading these extracts he felt convinced that the Association, holding Herr Wothly's patent, reserved unpublished the best part of the description. He then adds:—"The arrival of Herr Wothly in Paris, and the conversations we have had with the inventor, have entirely confirmed our opinion on this point. The French patent, which we have examined, carries many important indications which we do not find in the preceding extract, and which constitute a different system altogether from any which has been practised hitherto." We are not ready to believe that the suppression, if any suppression there be, is the act of the gentlemen conducting the Association. We cannot readily believe that they would be guilty of the extreme folly of nullifying their patent by the suppression of details. There are two forms of protection for the inventor, secresy and patents. But the two cannot be combined. He must forego the one or give the other. There can be no patent without publicity, and no valid patent without full, complete, and unreserved publicity. We cannot conceive the gentlemen of the Association so ignorant as to imagine that they could combine the two. And we now call upon them in fairness to themselves, to their shareholders, and to all those who

are interested in their patent, that they place the question beyond doubt by a distinct declaration on the subject.

M. Lacan, in stating the claims of Herr Wothly, remarks that they comprehend three things:—

First. The manufacture of triple salts, entirely new, employed as sensitizers, and a series of salts which reduce uranium (*sels réducteurs de l'urane*).

Second. The preparation of special papers.

Third. Manipulations, comprising the process of priuting.

The second and third of these are comprehended in the English specification, the first appearing to be altogether absent. There is no allusion to triple salts in the specification, but a vague and apparently incorrect reference to a double salt of uranium and silver. Nor is there any reference to salts which reduce uranium. On the contrary, it is uranium which acts as the reducing agent in the process described. We do not enter further into the matter now. We wait for the disclaimer of the Association as to the alleged suppression.

As for the process itself, so far as we kuow it, we repeat what we have before said, that we believe it possesses claims of its own well worthy of attention. In our recent experiments we have met with a very wide range of results, which, whilst they show that there is much to learn as to the best conditions, also show that there is an amount of control over varied results we had not before anticipated, and we believe that as the absence of the organic compound of silver, impossible to eliminate from the albumenized print, may be avoided here, there is a promise of permanency greater than is found in the present system of silver printing. We shall have more to say on the details of the process shortly. Inthe meantime we may mention that Mr. Cooper's interestingpaper on the subject, read at the meeting of the London Photographic Society, and illustrated with some charming specimens, will appear in our next.

DUBLIN INTERNATIONAL EXHIBITION.

In the general rules and regulations in connection with this Exhibition, which we published a few weeks ago, it was stated that no medals or certificates would be awarded to photographers. This decision was one which arose out of the high classification our art had received. It was ranked amongst the fine arts, and as they receive no medals, photography shared in that exclusion. Sir Jocelyn Coghill, the gentleman to whom the management of the photographic department has been wisely confided, has, however, foreseen that some dissatisfaction was possible on this head, as in photographic exhibitions hitherto, medals have been awarded, and have been regarded as stimulants to effort and progress. Having duly represented the case to the executive committee we are glad to announce that an exception to the general rule which applies to fine arts, will be made in favour of photography, and we are authorized to publish the following notice:—

Dublin International Exhibition, 1865.
Fine Arts Department, Class F.
Exhibition Palace, Dublin, December 5th, 1864.

Photographers and others are hereby informed, that the thirty-first general rule in the prospectus of the Dublin International Exhibition, which states that "*medals and certificates of merit will be awarded in all sections except in that of F. (fine arts)*," is altered with respect to the photographic department, in which medals and certificates of merit will be awarded.

Signed, J. J. Coghill,
Hon. Director Photographic Department.

We would take this opportunity of urging upon photographers the importance of an early communication with Sir Jocelyn Coghill, in regard to space. The natural tendency to put off until a subsequent period any steps in matter which does not seem to demand immediate action, may cause many photographers to delay their applications for space. But it must be remembered that such delay must materially cripple the exertions of those gentlemen entrusted with the arrangements, to whom an early knowledge of the probable demand is a matter of vital importance.

Critical Notices.

HYPERION, A Romance. By Henry W. Longfellow. Illustrated with Photographs, by Francis Frith. London: A. W. Bennet.

Of all the books we know suitable for photographic illustration, we think Longfellow's "Hyperion" one of the best; the plot carrying the reader, as it does, through the most picturesque and sublime scenery of Europe,—the Rhine, Switzerland and the Tyrol. The Rhine is pre-eminently the poet's and artist's river, abounding in castellated crags and old-world legends, and Switzerland, the land of snow-clad mountains, where the King of Winter has thrown down his gauntlet of ice in defiance of the sun; but not of the sun's votaries, for here it is, that they meet with some of their greatest successes; witness the pictures of Bisson, England, and Stephen Thompson, and a few others.

Regarding the photographs in the volume before us, we are compelled to stop short of full praise. Gorgeously arrayed in crimson and gold, printed superbly on toned paper, and enriched with carefully executed wood cuts, this is a book of which any publisher might be proud, and we congratulate Mr. Bennett on its publication; but for such a volume, and for the sake of photography, we should desire the most perfect illustrations that the art could produce.

Capable as we are sure photography is of illustrating books devoted principally to the description of scenery, it is unfortunate that nothing of the kind has ever yet been done showing any approximation to the perfection which we have a right to expect. In an admirably written preface, Mr. Frith disarms our criticism:—"He would bespeak the utmost liberality of criticism, especially from those who are not practically acquainted with the artistic difficulties of the work." We can therefore only regret that Mr Frith should have so closely followed the canons of the old school of photography, the ideas of the time before bromide was introduced into collodion, and when pyrogallic acid was the only developer; when white skies were imperative, and black shadows tolerable; when softness was called "fog," and tone was uncared for; and pass on to the few pictures to which the obsolete style of proceeding has not been absolutely fatal. "Innsbruck" affords the subject for one of the best illustrations in the book, brilliant and clear, the shadows of the old houses fall with the happiest effect; the column in the centre surrounded by saints and angels affords a good foreground object, and the "everlasting snows" in the distance complete a charming picture. On apparently the most difficult subjects, Mr. Frith has met with his greatest successes, "The Tomb of Maximilian," feebly lighted from one side only, makes an effective subject. The "Devil's Bridge" would have been the better for a greater breadth of light and shade. "Heidelberg Castle," with the distant mountains vanishing in mist, is soft and dreamy, and very much to our taste, while the succeeding illustration, "Entrance to the Valley of Birkenau," reminds us of a scene in Wales, the figure and foreground very happy. The "Stanbbach," soft, delicate, and well composed, is cut up and ruined by a sky of unmitigated whiteness. "Landeck" seems to be one of the most charming spots on the earth, and of it, fortunately, here is an illustration in all respects perfect; there is a general "fitness" about this view that we have not in any of the others, the composition and light and shade could scarcely have been better, and the harsh blacks and white too prevalent in the book are absent.

Altogether, in spite of the few drawbacks we have felt it right to notice, this is a very charming volume, and we hope to see it succeeded by others, year after year, from the same enterprising publishers.

INSTANTANEOUS VIEWS OF DOVER, RAMSGATE, MARGATE, &c. By Valentine Blanchard. London: C. E Elliot.

In the dearth of instantaneous pictures which has prevailed of late, it is very refreshing to take up a series like this before us; and it is not less gratifying to reflect that whilst the field of instantaneous and marine photography appears to be left now to one man, that his work leaves no room for regrets as to the mode in which the field is filled. When, about three years ago, we noticed a series of this class of pictures published anonymously, we ventured, on the strength of conjecture, to connect Mr. Blanchard's name with them, and we warned the foremost instantaneous men of the day to look to their laurels. Since then Mr. Blanchard's progress has placed him in an unequivocal position, as rivalled by few and second to none, in this charming branch of photography.

In the pictures before us we have examples of every class of effect worth perpetuating in marine photography, and in many of the individual pictures we have a complete epitome of all the beauties of photographic and pictorial art. We have well chosen subjects, well balanced masses, and perfect breadth and harmony; forcible foregrounds, delicate distances, transparent water, and atmospheric sky; plenty of incident and action; well-placed figures; pure lights, deep shadows; fullness of detail, gradation, tone, and colour; spotless photography and admirable printing. With a series abounding in examples of these qualities, it becomes a difficult task to describe or individualise special pictures.

The above remarks, we know, are written in the superlative degree, but in the presence of such pictures as these, we feel that we could not do less, and do justice. The series before us consists of about thirty views, and we find it difficult, they are all so equal in excellence, to select any individual example for special remark. "The Harbour at sunset, Ramsgate," a poor subject, with ugly foreground objects, is converted into a scene of gloomy grandeur by a magnificent sky, in which the sun is just emerging from behind masses of golden tipped clouds, affording a good example of how photography may be lifted from the commonplace by skilful treatment and judicious choice of effect. "The Lighthouse and Pier," and "The Harbour at high water," Margate, are examples of the perfect reproductions of, perhaps, the most difficult kind of cloud beauty, the mackerel sky. "The Beach, looking west," "Panoramic view of Dover," "Dover from Deal road," and "The East Cliff, Dover," are all charming examples of cloud and atmospheric effects, and, although so much attention has been paid to the sky, the landscape has not been neglected, we find none of the blackness, so common when earth and sky are attempted on one plate; but there is a perfect union of softness and brilliancy. "The Harbour and Custom House, Ramsgate," and "A Parting Glance," are curious studies of effect very excellent in their way.

Perhaps the most interesting of these slides to the general public will be those representing life at the sea-side, as seen at Ramsgate and Margate. Mr. Blanchard has not represented these favourite watering-places as "cities of the dead"—a fault so frequent in street views—but he has given us the life and bustle, the excitement of arriving and departing boats, and the amusements to be found in the street and on the beach. "Niggers" seem to be an institution at both places. In one slide—"A Darkies' Concert on the Fort"—these sable melodists have attracted a large crowd; and we may here remark on the great art with which Mr. Blanchard has used the ring of spectators as material elements in his composition. "Morning Entertainments on the sands, Ramsgate," a crowd of spectators to that legitimate drama, Punch's show, and the band of black brethren; in the middle distance the bathing machines are in the full swing of business, and the eye is carried into the extreme distance by gradually diminishing vessels stretching out to sea. "The Beach on a hot July morning" we consider to be, for pictorial effect, the gem of the collection; the happily-disposed figures, perfectly unconscious of the presence of a photographer, remind us of Frith's well-known painting, "Ramsgate Sands;" and, indeed, for absolute naturalness of effect, we think we prefer the photograph.

To go on through the series in detail would be but to reiterate continued praise, we will, therefore, content ourselves with giving a list of some of the most remarkable slides we have left unnoticed. "A Busy Time amongst the Bathers," "Waiting for a Duck (before dinner) (not for dinner)" and "A Crowd of Bathers," all represent Phillpot's well-known bathing machines at their busiest time. "Broadstairs Regatta," "The London Steamer," and the "Lower Marine Terrace, Margate," are effective and good pictures; while "The Sands at High Water," and "High Water at Midday," both representing crowds or people watching

"The league-long rollers thundering on the reef,"

have never been surpassed.

We have heard it often made subject of regret that the taste and demand for stereoscopic pictures had so completely declined. The trash with which the market was inundated rendered such a consummation as desirable as inevitable. But the demand can never be entirely dead whilst such pictures as these are accessible, and if anything can thoroughly revive it, the wide dissemination of this and similar excellent examples cannot fail to do so.

CHARGES FOR PHOTOGRAPHIC COMMISSIONS.

The following details of a case recently heard in the Lord Mayor's Court, in which the question of the proper charges for photographic out-door commissions arises, will interest our readers.

Lord Mayor's Court.—

(*Before* Russell Gurney *Esq., the Recorder, and Common Juries.*)

Nottage *v.* Green.

The plaintiff in this case is the managing partner of the London Stereoscopic and Photographic Company, Cheapside, and the defendant a china and glass manufacturer and warehouseman.

Mr. Henry James appeared for the plaintiff, and Mr. Talfourd Salter for the defendant.

The learned counsel, in opening the case for the plaintiff, said, that the action was brought to recover a sum of money under the following circumstances. The defendant Mr. Green, fitted up with glass the interior of the Sultan of Turkey's steam yacht, *Thalia*. He was anxious to have views of the same taken, in order to promote his business, and he knew of no better mode of having that done than by photographs. Accordingly, he engaged the plaintiff to take the same. The first day two operators were sent down; they found the cabin door locked, and no one there to admit them. They accordingly returned to town. They went down a second time to Woolwich, when they found the yacht moored directly under the pier, in such a dark position as to render it utterly impossible for the operators to perform their task. They went down a third and fourth time with equally unsatisfactory results. The defendant was repeatedly warned of the great expense he was incurring. The plaintiff sent in a bill for four days at five guineas per day as usual, £21, and some small charges, 11s. 6d.; from this amount the plaintiff offered to deduct eight guineas, in consequence of the unsatisfactory results. The defendant had paid £5 into court, and as to the rest pleaded never indebted.

The plaintiff (Mr. Nottage) detailed the result of an interview with Mr. Green, in which, in consideration of the unfortunate circumstances (but with which his operators had nothing whatever to do), consented to reduce the amount to £3 3s. per day, at the same time telling Mr. Green, that as at that time they were exceedingly busy, he would cheerfully have given him a larger sum not to have engaged the operators at all. Mr. Green then asked Mr. Nottage to reduce the amount to £2 12s. 6d. per day, but Mr. Nottage firmly declined, and told Mr. Green he ought not, after the liberal concession that had been made, ask for any further abatement. Mr. Green then left, saying he would call in a day or two, and Mr. Nottage

expected to receive a cheque, instead of which he had a lawyer's letter, stating they were instructed to resist the claim.

Other witnesses were called on the part of the plaintiff, to prove that Mr. Green was repeatedly warned of the accumulating expenses, and advised not to make any further attempts on account of the difficulties attending the work.

The counsel for the defendant cross examined the plaintiff's witnesses as to their wages, which question was resisted, but the judge ruled that if pressed, it must be answered, which was consequently done. The learned counsel then addressed the jury for the defendant, and contended that, from what he had ascertained the plaintiff paid his operators, he was justified in paying into court no more than their actual wages, and therefore £5 was sufficient.

The Recorder: According to your own showing, Mr. Salter, you have paid in too little, and then there are the expenses you have not allowed for.

Mr. Salter: Well my Lord, we have paid in what we thought was right, I regret if there is any error. I may mention that when the case was first called last term, we were prepared with a most respectable witness from Regent Street, who would have proved the charge was too much, but he has gone out of town.

Mr. Green, jun., was called, and denied there had been any contract as to price, but was warned that the charges would be heavy.

Mr. Green, senr. (the defendant), was called, and admitted that Mr. Nottage had fairly stated the conversation with him.

This concluded the evidence.

Mr. King James: Gentlemen, My learned friend has told you that when this case was first put down for hearing, they had a most respectable photographer to prove that the charge was excessive. But, unfortunately, he had "gone out of town," and he had now no witnesses as to charges? I really pity my learned friend? Is there no respectable photographer in London who can come to his aid? Not one left! Have all the respectable photographers gone out of town? (Loud laughter.) This action I consider undefended, for Mr. Green confirms Mr. Nottage's evidence, and he proves that £10 10s. was offered, and now only £5 is paid into court? And then how would my learned friend like to be placed in the situation he has placed my witnesses? Would he like to be placed in that box, and be compelled to declare in open court, before friends, enemies, and strangers, what his income is? It must indeed be a miserably weak case which requires such tactics to sustain it. I rely with confidence on your returning a verdict for the full amount my client claims.

The Recorder: Gentlemen, This case is a simple one. If you believe the plaintiff's witnesses, it would appear that they were fully prepared to do the work, but nothing was prepared for them to do. With respect to the principle of paying the amount, the plaintiff has actually paid to his assistants, is one which I don't think you will hardly consider yourselves justified in adopting. As tradesmen you would not like, I think, in a disputed account, to have the actual amount you paid to your workmen, tendered to you. I now leave the case in your hands.

The jury after a few minutes consultation, and without leaving the box, returned a verdict for the plaintiff for the full amount claimed.

The court was much crowded, and great interest was manifested throughout.

PHOTOGRAPHIC PORTRAITURE.—ON LIGHTING AND POSE.

BY M.M. PETSCH AND H. VOGEL.

When we survey the development of photography from its earliest essays until the present day, we remark, that in principle, its chief object has been to perfect more and more the mechanical operations necessary to obtain the picture and secure the greatest stability to the results; the purely technical side of photography has been cultivated. We have devoted our ingenuity to contriving the physical and chemical processes which, in the operating room, mysteriously brought forth pictures. Next the chemical effects of light were studied, and the differences of effect obtained from each colour, the influence of certain agents employed upon the sensitiveness, and the quickness of impression. And it is to these efforts, attempted both by science and practice, that photography has, undoubtedly, arrived at such a high degree of perfection. One part of its domain, *the artistic*, has remained till now almost unexplored.

What are the qualities we demand in a good photographic portrait? First, a clear and accurate design, an agreeable distribution of light and shade, and a hue pleasant to the eye; such are the *technical* perfections which every operator may obtain with good apparatus, pure chemicals, and careful manipulation. We know that in this respect there is nothing to be desired, now that mechanics and chemistry furnish us with apparatus and chemicals of excellent quality. We demand, also, in a portrait, an easy attitude, expression, accessories tastefully arranged, and a distribution of light and shade in proportion to the model, in other words, an intelligent lighting. These are *artistic* perfections; to obtain them, it is not enough to have the best apparatus and chemicals, it is necessary that the operator himself possess feeling and taste, and it is to his personal talent that all the merit of having created an art responding to all these conditions is due.

At the present day we are literally inundated with *cartes de visite;* but if we begin by rejecting all those which present even no technical merit, it will easy for us to show that among this prodigious multitude of portraits only a very limited number at all satisfy the requirements of pure art.

Let us not be accused of pedantry, if we dwell a little upon these defects. We have in view the interests of art only; our criticism may appear a little severe, perhaps. It will have accomplished its sole aim if those it touches apply themselves to improving their weak points. Let us add that the photographers to whom we allude are absolutely irreproachable under the technical relation, a picture that does not also satify us in this particular would be unworthy of occupying a moment's consideration.

What is the cause that so many pictures, perfect in a technical aspect, do not please, and that although presenting a faithful copy of the model, do not resemble it, and are generally considered bad? "It is the fault of the original!" exclaim many operators, "I cannot make a man of a baboon."

Very frequently, such an excuse is quite reasonable. Without doubt, the photographer is powerless to render the picture handsomer than the model. Still there is no face so ugly but it may be improved by being taken under one aspect rather than another, its defects disappearing more or less according as the face is presented full or in profile. To seize the defects at a glance, to recognise the aspect that best conceals them, is one of the most important aptitudes in the portrait artist. The rapid solution of this problem enables him to produce what many regard as flattering likenesses, although, strictly speaking, they are only faithful copies of the original, but the original presented under its most favourable aspect. This valuable faculty is unhappily deficient in a great number of photographers, even the most skilful. Very frequently they copy the model, not in its best aspect, but in its worst, and, moreover, take it in a most unfavourable attitude. Such portraits may boast of being faithful copies from nature—the public is none the less correct in pronouncing them detestable.

Still we do not throw upon the photographer the exclusive responsibility of these *artistic* faults; they also depend greatly upon the *tournure*—the costume and expression of the model.

Heaven knows how difficult many models are to manage! Some, stiff as a poker, often oppose every effort of the photographer to place them in an agreeable attitude, with an obstinate resistance, and sometimes with an impatience and ill-humour that is inevitably reproduced in the portrait. Others obstinately place themselves in the most ungainly attitudes, or cannot remain still a moment, to whom the

head-rest is of no sort of use; others overdress themselves in a style most unsuitable for a picture, or come overlaid with trinkets and jewellery. In fact, a host of circumstances conspire to injure the picture and impress upon it defects, which, although generally attributed to the artist, while, in fact, the public is wholly responsible for them. Let us add, that the time allowed to the photographer to examine his model is very restricted. The painter has the opportunity of studying his model at his leisure, under every aspect. He learns its physical and moral qualities, its habits, manners, and gestures; he is able to observe all these, and also to seize the most favourable moment to pose his model under every advantage. The photographer, on the contrary, is deprived of all latitude; a few seconds or minutes are all that are allowed to him to study his models, to arrange and group them, and then hastily photograph them.

His task is therefore infinitely more difficult than that of the painter, the more so as we cannot photograph everything that we can paint, as the original presents itself under the most unfavourable conditions, and as, unfortunately, the objective supplies none of the resources obtainable by the blending of colours.

The photographer who succeeds in surmounting all these difficulties is entitled to much more praise than the painter, since his task is much more arduous; and he has no less right to the title of artist than the portrait-painter, too much disposed, perhaps, to look down upon him from the elevation of his easel.—*Le Moniteur de la Photographie.*

(To be continued.)

ÆSTHETICS OF PHOTOGRAPHY.*

Being Short Lesson in Photography.—No. 29.

Landscape Photography.

To light up a landscape artistically and agreeably is altogether, as a matter of course, beyond the control of the photographic artist; all that he can do is to select the best time of day and the season of the year when the result would be most favourable.

The duty of the artist consists simply, therefore, in making the proper selection; but to do this requires considerable knowledge of art, to be imbued with feelings for the agreeable and the beautiful, and to possess a clear conception in reference to the working of his photographic chemicals.

If we analyse our sensations of the agreeable and the beautiful, we shall find that, as far as light is concerned (and this is the subject of our present lesson), *variety* is the principal charm; but the nature of this variety must not be misunderstood. We do not mean by this variety patches of light scattered all over the landscape in regular and systematic order, communicating to the photograph an appearance of small-pox or a chess-board. Nothing can be less artistic than this. But there are those whose paintings are characterised by such a display of mechanical draughting; and it is possible, too, to find nature sometimes, though very rarely, illuminated in such a fantastic way. It is to the sight what an unscrupulous accentuation of almost each word in a phrase is to the well-trained ear.

The variety, which we comprehend as indispensable, is a sort of subdued contrast of light and shade in masses, all subserving the purpose of producing relief, increasing the perspective, or separating certain parts from the rest.

This sort of illumination cannot be effected by diffused light alone, nor by the direct rays of the sun alone, that is in neither case without the intervention of clouds, woods or mountains, &c. Thus, when the sky, that is, the visible hemisphere, is covered with a uniform sheet of vapour, shutting out all avenues to any brighter illumination, it cannot be expected that a landscape beneath such a sky will exhibit any variety of light and shady patches, it will present a view suffused with one uniform and sober tint; and when such a landscape is reproduced by photography, the picture will, in almost every instance, give an appearance of flatness, throwing photography far into the rear of art and beauteous delineation. But this is not all, for if the art of focussing, or the optical principles of the lens be not understood, the picture may exhibit a pseudo-perspective producing distortion.

Such an illumination for whitewashed or painted houses however, with which our country is studded, will perhaps be the best in those cases where such edifices are to form the principal objects in the photograph; and for two reasons; first, because with the direct rays of the sun upon them the actinic action of the white surface of such buildings, and that of the sky as a background, are about equally intense, and thus frequently the outline between the building and the sky becomes obliterated; secondly, because the white parts become solarised long before the verdure of the surrounding trees and shrubs have made a complete impression on the sensitised film. The scenery around being of secondary consideration, it will not matter greatly whether this be reproduced in strict accordance with the rules of perspective or not. If it be of importance to represent the landscape as well as the edifice in question with as much artistic skill as can be attained in photography, another light will have to be selected for the performance of the task.

In like manner, if the sun is in or near the meridian, and not far distant from the zenith, it is evident the rays will fall nearly perpendicular upon the scene beneath, thus covering the visible landscape with a flood of light uniformly brilliant. Such a scene depicted on the albumen sheet can hardly fail to be flat and unsatisfactory. The only views that admit of a certain amount of artistic posing, if we may thus use the term, with the noonday sun, are deep ravines, gullies, and excavations; for with such a light the deep parts become visible, and the surrounding crags and hanging trees, by their projections into the light, produce sufficient contrast with the illuminated specks beneath. To obtain the most satisfactory pictures of such wild scenery as just indicated, it is necessary that the artist should reconnoitre the ground carefully, and examine beforehand the scenes he has selected for reproduction by the camera, and ascertain exactly from what point and at what hour of the day they possess the most charming aspect. By such a proceeding he cannot fail to perceive a vast difference in the beautiful of the sublime; and by this mode of discrimination he will learn to descry beauty where it is present, and thus cultivate art. The entrance into a ravine or deep valley can be photographed more satisfactorily when the sun is nearer the horizon, and his rays shine almost in a line with the direction of the scene.

The trouble of solarization is generally manifested in the photographs of deep and dark glens, because of the necessary length of time devoted to the exposure; this shows itself by producing snow-white trees and foliage on those parts to which the rays of the sun have penetrated. Fortunately it can be remedied, and very effectually, by the application of the requisite colour, as, for instance, green, yellow, bistre, ochre, red, etc., in very thin layers; and we have the satisfaction of thus obtaining a life-like picture of the almost unfathomable recesses of nature.

Placing on one side the reservations referred to in the two cases, we now approach the true artistic ground, the ground in which the photographer has to sum up all the taste, skill, and experience of an artist; for the latter deals with clouds, mountains, forests, fortified towers, sheets of water, prairies, snow, avalanches, and thunder storms, as the cook does with flour, butter, salt, pepper, and fruits in the manufacture of a dumplin; he mixes them, collocates them, arranges and re-arranges them until they suit his sensitive eyesight, just as the proper mixture of the pudding affects the nervous fibrils of the organs of taste.

Some artists have *set* ways about the introduction of light into their compositions, and these, consequently bear a characteristic impress of their origin. As if nature could be beautiful only in one way. Thus the landscapes of certain painters are distinguished by two patches of light imbedded in the midst of dark regions; whilst others invariably are not satisfied with less than three. This, of course, is sheer pedantry.

It may be that the portrait of a human being may be characteristic of the man only in one position, other circumstances naturally combining; but this rule does not hold good, and is far from being absolute with a landscape. The latter may be handsome from several points, and characteristic with a variety in the illumination.

To attain to certain ends it becomes necessary, notwithstanding, that the photographer must have certain principles *fixed*; for he has not clouds, sunshine, and shadow within his control. To get an approximation to perspective he must fix the time and stand-point (as the Germans would say) so as

to have the foreground well illumined, and the background retiring into shade, or the foreground partially in sunshine and partially in shadow, whilst at some distance a patch of light darts in between intervening woods or mountains upon one side of a glen, full of happy accidents, leaving the distant background in the shade; or, finally, the foreground is beneath the shadow of a cloud or of a towering mountain, whilst the distance is suffused with a brilliant light from behind the cloud or above the mountain. At certain seasons of the year such spectacles are not rare, and they form decidedly some of the most beautiful scenes of nature. During the months of March and April, and the beginning of May, in in the early part of the year, as also of September, October, and November, clouds are more frequent than during the rest of the year, and diversify nature with the most magnificent apparel, and give great depth to distance, which, without them and their functions of splitting up sunlight, would be almost imperceptible; and the landscape would be tame.

Scarcely anything can be handsomer than a scene in which the foreground consists of water and woodland in the shade, whilst beyond and far away the illumination exhibits distinctly villages and their spires of worship, and terminating with tall forest trees on the mountains, either imbedded in dark clouds or in full relief against a bright sky. Now, to obtain an illumination which will produce such effects requires—what? —patience and watching. For if a scene is worth reproducing it is worthy of being done well. As a general occurrence, success will be most probable, not only during the months enumerated, but also during the morning or the afternoon in preference to noontide; for *mid*summer and *mid*day are equally opposed to the production of artistic photographs.

With the exception of the above-enumerated rules and reservations, the artist-photographer is left almost entirely, in reference to the disposition or selection of his light to his own taste and experience. The best advice that can be given to him, and this advice ought to be received, as it is given, in earnest, consists in the recommendation to him to examine the photographic reproductions of the works of artists who are admitted by public estimation to stand highest. Each photograph is an invaluable lesson in the cultivation of taste; the photographer will from them soon learn to comprehend what is meant by the word taste, without being able fully to describe its meaning; and he will find, too, that the same goal can be attained by the most diversified means.

After he has thus made himself master of the rudiments, has crossed the Rubicon of Art, and has learned to estimate all productions by an innate, although indescribable sensation which he feels assured is right; because the observance of its indications always produces the same sort of pleasure which arises from the aspect of the beautiful, he will then endeavour by means of the lens, collodion, and silver, to catch nature on the wing, and fix the fitful scenes of landscape when decked in her most felicitous robes.

RECOVERY OF SILVER FROM WASHINGS OF PRINTS, &c.

The following excellent remarks, from the *American Journal of Photography*, we recommend to the attention of our readers. The custom of using an unnecessarily large quantity of water in washing, and also the great excess of salt used in precipitating the chloride often causes much trouble and perplexity to the operator inexperienced in chemical manipulations. He will see here the reason clearly set forth why he should avoid these practices:—

"Save the silver, has been a frequent recommendation of this Journal; and the advice is not given in vain. There are very many of our readers who, at a trifling expense, recover more than one-half of the silver which they purchase. But there are others who, at much labour, save very little: what is the matter with these latter? We have lately seen two lots of 'waste,' which contained the savings of two thriving galleries, which had been produced in the space of nearly a year; and the amount of silver in them did not pay the cost of separation. On inquiry, we learned that the method of saving in both cases was substantially the same, the one best calculated to collect a good quantity of dirt, while it permitted the silver to get away.

"There is a fundamental principle which should be had in view by those who wish to save silver easily, and that is, that the solution from which silver is to be precipitated should be as strong as practicable. If any one has a doubt of it, let him try a few experiments:—Dissolve 60 grains of nitrate of silver in a barrel of water; now recover the silver. Add to the barrel of solution of nitrate of silver, 60 grains of salt previously dissolved in a small quantity of water. The nitrate is now completely converted into chloride of silver. Now the chloride is a solid body, quite insoluble in water, and yet in this case the fact does not clearly appear. The water is scarcely turbid, it goes through a filter unchanged, and without leaving anything on it. Leave the whole mass of water at rest for a day, and the lower stratum will be slightly different from that on the top, but yet the chloride of silver is still entirely suspended. Let the water rest a month, and the precipitate will have fallen to the bottom, and by carefully decanting the water a considerable part of it might be recovered. If, instead of six grains of salt, a handful be thrown in, no precipitate would ever appear, for in that case it would have been completely dissolved. If any one will try the experiment during the pressure of business of his gallery, he will be thoroughly satisfied that it is not worth his while to save silver from very weak solutions. Dissolve the sixty grains of silver in half an ounce of water, convert into chloride, and the chloride can be recovered completely in a few minutes. From weak solutions precipitates are light and fine; from strong solutions, heavy and coarse.

"The error of silver savers who fail, is the unnecessary dilution of solutions. There are various jimcrack contrivances which the inventors claim will keep back the silver, however much water passes through them; and they place them in sinks where all the washing water passes; these humbugs ought to be abolished. A two-gallon earthen jar set near the developing place will save all the silver that is worth while to save from the development in the largest establishments in the country. Let the waste developer and the first washings, not to exceed two or three ounces for a 4-4 plate, go into it; every morning pour off the water. A large vessel may be more convenient, but there will be risk of putting too much water into it."

Proceedings of Societies.

The London Photographic Society.

The usual monthly meeting of this Society was held at King's College on the evening of Tuesday the 6th inst. Mr. J. Glaisher, F.R.S., &c., in the chair. The meeting was one of the most interesting and full of matter which we remember to have attended for many years; although, owing to the number of papers and other matters of interest before the meeting, there was but little time for discussion.

The Secretary read the minutes of a preceding meeting, which were confirmed.

The Chairman then read a paper on Micro-photography, by Dr. Maddox, after which Mr. How exhibited, by means of the magic lantern and oxyhydrogen light, several of the specimens referred to in the paper. The perfect definition and general excellence excited general admiration.

Dr. Wright kindly volunteered some interesting details in regard to the examples of diatoms exhibited.

The Chairman said that he regarded it a great achievement in photography to render with such perfection as they had seen on the screen, objects so small in size that four millions of them would be required to cover one square inch. Those members who wished to see more of them might do so at Mr. How's place in Foster Lane.

Mr. Jabez Hughes then rose to read a paper on the "Tannin Processes." He premised it by saying that if he had had any idea that the meeting would have been so fully provided with interesting matter, we would not have obtruded himself or his remarks. But—

The Chairman, interposing, said he was very glad Mr. Hughes did not know, for they would have been sorry to lose

them. He might here, perhaps, with propriety refer to a resolution come to in Council with regard to papers. They had had a long meeting, and reviewed the whole state of the Society; and they had also come to certain resolutions which would, he hoped prove beneficial. One of them was to the effect that all papers and communications read should be the exclusive property of the Society, and should not be published elsewhere until after they had appeared in the Society's own journal.*

A conversational discussion followed between the Chairman and Mr. Greenwood, who enquired if it would be regarded as a contravention of this resolution if full reports of such papers taken down by a short-hand writer were published before the Society's Journal.

The Chairman said that such a proceeding would be a breach of copyright, and ought not to be done. Abstracts so taken might be published, but not the full papers.

Mr. Hughes resumed. He remarked that when he (and doubtless many others) attended the last meeting at some trouble to himself, and found his time and that of others wasted, no paper having been provided, and when the Chairman made an earnest appeal to members to aid in remedying such a state of things, he resolved that he for one would do something to prevent such a recurrence, and therefore it was, he brought a paper before them without any pretentions to novelty, but a simple statement of his own experiencies in working a valuable process. He then proceeded to read his paper, which shall appear in our pages in due course. He also exhibited a series of excellent prints, and some negatives in illustration of his remarks.

Mr. England asked if Mr. Hughes had been successful in rendering deep foliage by the tanuin process.

Mr. Hughes had. It was chiefly a matter of exposure.

Mr. England said the subjects which Mr. Hughes exhibited, being chiefly architectural, were of course easier than foliage.

The Chairman examining some of the negatives, remarked that the degree of density varied. In one, the sky was quite black and could not be seen through, whilst another was comparatively transparent. There was also a patch, apparently wanting in sensitiveness.

Mr. Hughes explained that he had selected the negatives as extreme cases, to show the various possibilities. The plate with the very dense sky had received very long exposure, and was developed with acid pyro. The other sky had received a short exposure and alkaline development. But in both cases there really was practically a similar degree of intensity. In the thin one he started from bare glass in the deepest shadows, and did not need to have a very great density in the sky to secure the proper gradation and relation between the various tones. But in the other, there was some deposit on the deepest shadows, and hence the necessity for a still greater deposit and greater density in the highest lights. There was, therefore, similar harmony in each case. The patch on which the plate appeared less sensitive, was due to an imperfect penetration of the tannin at that point.

The Chairman was glad to receive an answer so full and satisfactory.

A Member asked Mr. Hughes as to the comparative certainty of this process as compared with the wet collodion process.

The Chairman said he thought Mr. Hughes had answered that very fully in his paper.

Mr. Hughes said that out of twenty plates with each process, he thought he would secure more good negatives by the tannin process.

Mr. F. Eliot asked if Mr. Hughes had experimented with different strengths of the tannin solution. He believed that with subjects possessing much contrast a three or four-grain solution would give more harmonious results.

Mr. Hughes said he had simply described his own experience in which he had adhered to the fifteen-grain solution. He had tried no other. He was perhaps wrong in so doing; but in his hands that had generally answered well.

Mr. Eliot said that where deep foliage was to be rendered, an advantage would, he thought, be gained by using a weaker solution.

The Chairman asked the meeting to give Mr. Hughes their very hearty thanks for such a practical paper. Such a response to his appeal of last month was a proof that members only needed to be asked to induce them to respond in a degree corresponding with the wants of the Society.

A vote of thanks having been passed by acclamation,

Mr. Henry Cooper, junr., proceeded to read an interesting paper on "Uranium Prints," which will appear in our next. Mr. Cooper exhibited a number of exceedingly fine specimens of the varied results possible, and with them some silver prints on albumenized paper from the same negatives. The specimens were examined with much interest, and excited much admiration, a general impression prevailing that in many instances, the uranium prints were best.

Mr. J. Williams explained that in adding an alkali to nitrate of uranium, the precipitate was not oxide of uranium but a uranite of the alkali; a salt formed by the combination of uranic acid with the alkali.

Mr. Cooper said, that no doubt would account for some of the peculiar results he had obtained.

The Chairman said, that as the hour was late, and Mr. Cooper held out a hope of further details, it would be better not to enter into lengthened discussion, but he hoped they would give their very hearty thanks to Mr. Cooper for the interesting details and specimens he had brought before them, and to encourage him to proceed with the experiments the details of which they were promised. A vote of thanks was then passed by acclamation.

Mr. Peter le Neve Foster then exhibited some copies of engineers' drawings by a new and patent process, the details of which were not yet published. No negative was required the original drawing serving that purpose. The results were excellent and cheap.

Mr. Hart exhibited and explained an apparatus for recovering the silver from hyposulphite solutions by the aid of electricity. A full description shall appear in our pages shortly.

Mr. Thomas exhibited and explained his box tent, a description of which has already appeared in our pages.

In accordance with the rules, the names of the retiring officers, and those nominated by the Council to fulfil their places was read. The retiring Vice-President was Col. Stuart Wortley, and in his place Dr. Wright was proposed. The retiring members of the Council were, Messrs. Pollock, Gassiott, Thurston Thompson, Robinson, and Dr. Wright. Proposed for election or re-election, Messrs. Mayall, Shadbolt, Thompson, Robinson, and Major Gresley. Members desiring to make other nominations must do so at the January meeting.

Mr. Hughes asked if these gentlemen's consent to act had been obtained; and if the annual meeting in February would be open to discuss general business.

The Chairman said that these gentlemen could not be consulted very well before they were nominated. The meeting would, in accordance with rule, be open to discuss all matters of which due notice should be given at the January meeting.

Mr. Aldis exhibited a fine solar camera enlargement of a group. The picture was 4 feet 6 inches long.

Several other specimens were exhibited, amongst which were some pantoscopic pictures by Mr. Johnstone. Some views of Rome, by Mr. Stewart, some enlargements by Mr. Warner, and some other matters to which the attention was not called.

The proceedings then terminated a little before 11 o'clock.

* We have one word to say regarding this resolution of the Council. We have always avoided the practice of anticipating the Society's own Journal in the publication of papers read at the Society's meetings. Whilst frequently in possession of the MSS. of such papers, we have felt it was a courtesy due to the Editor of the Society's Journal either to wait until the papers had appeared officially, or, under some circumstances, to publish them contemporaneously. We had, at the time the chairman spoke, copies of two of the papers to be read already in our possession, but we had no intention, and have no intention, to anticipate the Journal in their publication. Desiring earnestly the prosperity of the Society, we cannot object to a resolution, which will not render necessary any change in our own practice, by which the Society hopes to gain an advantage. But we must warn the Council against the spirit which the unnecessary resolution implies. It suggests the vague hope of some indefinite gain to be obtained by a spirit of exclusiveness altogether opposed to the genius of Photography, and unworthy of its representative Society.—Ed.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 7th Dec., 1864.

Dr. Van Monckhoven, commenting upon the Wothlytype in the *Bulletin Belge*, remarks that the process was represented to avoid the employment of salts of silver. But that

upon some specimens given to him by his friend Ghemar, he found positive traces of silver. This analysis agreed with that of M. Stas. Some specimens since received from M. Wothly, truly superb in colour, and much finer than those received from M. Ghemar, in these the gold appears to be the principal element of which the pictures are composed, while their brilliancy is due to the collodion with which the uranium salts are mixed.

Furnished with these facts, Dr. Van Monekhoven tried a process that gave very good results, nearly identical with M. Wothly's specimens. He does not assert that his process is the same, but the results obtained leads him to suppose that his method differs very little from that of M. Wothly. It is as follows :—

In 800 parts of ether, mixed with 200 parts of alcohol, dissolve 40 parts of gun-cotton. When the liquid has become clear by settling, dissolve in it, in a dark room, 50 to 100 parts of nitrate of uranium, and 5 parts of chloride of gold. The liquid is of a bright yellow colour.

To succeed well, it is necessary to employ nitrate of uranium, crystallized in ether, and chloride of gold as neutral as possible.

Next take a sheet of paper strongly sized with gelatine, or what is preferable, albumenized paper. Fasten it to a glass plate, and pour upon it thick uranium collodion, so as to obtain a smooth coating. This operation must be performed in a dark room. Suspend the paper to dry. It is now sensitive to the light. When placed in a printing frame under a negative, the proofs are of a very agreeable purple hue; but this process is not so rapid as that with chloride of silver. When the picture is printed strong enough, it is washed in warm water, then in two or three cold waters, and it is fixed. This process has much analogy with the uranium process of Messrs. Burnett and Draper.

M. Ommeganck, in reply to many enquiries respecting alcoholic gun-cotton, states that ordinary or etheric gun-cotton dissolves in a mixture of much ether with little gun-cotton, while the alcoholic cotton dissolves in a mixture of a large quantity of alcohol with a less quantity of ether.

The advantages presented by alcoholic collodion over etheric collodion are very numerous. First, it flows more readily and uniformly upon the glass plates, and never forms air bubbles; there is more latitude in putting it into the silver bath; it is much less subject to streaks, or marks of any kind; it becomes old quicker, and gives stronger pictures with a thinner film; because, with the same degree of fluidity, it sometimes contains double the quantity of gun-cotton that etheric collodion does; and finally, it is much less influenced by extremes of heat or cold.

Dr. Phipson communicates the following to *Le Moniteur de la Photographie*:—"I have more than once called attention to the influence of photography upon chemistry. Chemistry has created the photographic art, and that science has good reason to be satisfied with its offspring. A few years ago, students could not procure certain chemical agents, except at extremely high prices. Now, chemists owe to photography the facility of meeting in commerce, at very reasonable prices, iodide of potassium, iodine, bromine, cadmium, nitrate of silver, &c., and we shall soon have nitrate of uranium and the salts of lithium quite as cheap. Since the researches of M. H. Deville and Wœhler have given us aluminium, photography has stimulated the production of that very remarkable metal magnesium, which we can buy at about a franc the metre; and it is only since the existence of this art that gallic and pyrogallic acids, so useful in the analysis of gummy mixtures, have been found in the student's laboratory."

M. de Courten communicates the following to *Le Moniteur de la Photographie*, on toning :—

"We frequently see mention made of the change of colour photographs undergo in the hyposulphite bath, after being toned with chloride of gold, by resuming the red hue, in spite of the beautiful appearance of the proof, viewed by reflected light upon removal from the toning agent. Without discussing the cause of this change, I shall point out the means, which have always appeared to me quite sure, for ascertaining in a definite manner at what point we must stop the toning, in order to obtain a given tint.

"This means consists simply in viewing the proofs as transparencies, by daylight or lamplight, after they have been toned. The proof, which appears to have attained a very deep colour, is then really only of a reddish tint; passing it afterwards into the hyposulphite, it keeps this tint, only of a slightly redder hue. If the same proof, after being examined as a transparency, is returned to the toning bath, the action penetrates to the interior, the picture will exhibit a colour more or less deep, according to the length of time it has been toned, and the hyposulphite will bring it to a lighter tone, but the proofs in drying will resume exactly the same tint as they had in the gold toning bath."

PHOTOGRAPHY IN GERMANY.

Berlin, 27th November, 1864.

Dear Sir,—In the following I give you the details of a new silver printing process, by Mr. Schlater, a member of our society, which has given me very good results.

Dissolve 1 ounce of nitrate of silver in 18 ounces of water; pour into this solution liquor ammonia till the precipitate at first formed is redissolved, then, with caution, add pure nitric acid in the solution until a weak acid reaction is produced. The bath prepared in this manner contains, in 100 parts, about 5 parts of nitrate of silver. It gives very fine prints, printing and toning as well and quickly as a bath with 10 to 20 per cent. of nitrate of silver.

The fumigation of paper with ammonia is an excellent process, the paper prints twice as rapidly as the common paper, but the tendency of the tone is a little towards brown.

Mr. Harnecker, a member of our society, has written a very interesting paper upon his dry collodion-tannin plates. According to his communication it is necessary to be very careful in washing the cotton before the preparation of the collodion. He takes for one pound of collodion—

Soluble cotton	... ...	90 grains
Iodide of potassium	... ...	20 ,,
Iodide of ammonia	... ...	60 ,,
Iodide of cadmium	... ...	30 ,,
Bromide of cadmium	... ...	30 ,,

The collodion is to be prepared fourteen days before use. Then prepare the plates and sensitize in the silver bath—

Nitrate of silver	... ... 1 ounce
Water	... ... 16 ounces

with two drops of nitric acid to the ounce of nitrate of silver. The sensitized plate is dipped in distilled water, and then washed with distilled water. After this it is coated with a solution of tannin, 15 grains to the ounce, and dried in a large wooden box. These plates will work instantaneously when fresh, but after three or four days the sensibility is diminished. The development is a saturated solution of double carbonate of potassium—

Of this solution	... ... 15 drops
Water	... ... 1 ounce.

This solution is warmed in boiling water, then poured over the plate, and this is repeated several times; lastly, with the alkaline solution mix some drops of pyrogallic acid, then the image appears very fine and clear. The other processes are the same now in the wet collodion process.

I have seen some very fine carte portraits of Mr. Harnecker made with his dry plates. It is necessary to wash these plates well with distilled water before development.

Mr. Hecker, of Dresden, has presented to our photographic society a very interesting print. It was a copy from a large portrait negative. After removing this from

the printing frame, a *second weak image* was observed, the copy of a negative printed *before* in the same printing frame. It is probable that volatile substances were formed during the printing process. These substances remain on the blotting paper laid behind the albumen print and decomposed the nitrate of silver in the fresh sensitized paper, pressed afterwards with another negative in the same frame; by this, I believe, the second image arose thus.

In one of the last numbers of the Photographic News, you have written that the results of Mr. Roscoe's experiments would be at variance with the results of the experiments published in my paper on the behaviour of "Chloride, Bromide, and Iodide of Silver in the Light." I have not read the details of Mr. Roscoe's experiments; but, according to the communication in your journal, Mr. Roscoe has tried paper prepared with chloride, bromide, and iodide of potassium or sodium, then sensitized in a silver bath, and, at last, dried with the adherent silver solution. This paper, containing dry iodide or bromide, &c., of silver, with dry free nitrate of silver, is very different from the paper which I have prepared, and which contained either only the pure iodide or bromide of silver, or the same salts moistened with solution of nitrate of silver.

It is a very important point, whether the free nitrate of silver is dry or in solution, and the results are different under different conditions. It will be very interesting to me to hear more from you upon this subject.

The assertion, from Davanne and Girard, that chloride of silver is reduced by light to *metallic* silver, I shall treat upon another time.—Yours faithfully, Dr. H. Vogel.

PURE TERCHLORIDE OF GOLD.

Sir,—I was induced to trouble you about the chloride of gold, as I had noticed that, in the formulæ recommended at various times by continental photographic chemists, the perchloride or terchloride was always alluded to, and as that contains the quantity of metal given in the works I quoted, the difference existing in the commercial article cannot ensure the same results; you point out that the pure terchloride is not stable, then it would be a good answer that the manufacturer supplies an article which is so; but that is not the case, as he must seal it hermetically, or it deliquesces; but Mr. Eliot admits that his preparation is not stable in crystals, therefore he keeps it in solution, which I believe to be the ordinary method adopted when you crack one of the tubes in which the article is sold; now Sir, the real point is this, why cannot, or do not, the manufacturers prepare a pure terchloride, and sell it in solution? Plenty of photographers would, no doubt, be glad to get the best article, and would gladly pay an enhanced price for it; the question is, is it sufficiently stable in that form for the market? I presume it is; as a manufacturer expressd an opinion to me one day, that it might be so sold, and so does Mr. Eliot, and, with his experience, I conclude his authority ought to have some weight. Whatever Messrs. Johnson and Son may say about an impurity existing in his preparation, if Mr. Eliot obtains 2200 grains of chloride of gold from three ounces of metal, he produces the full per centage of gold required in the formula $AuCl_3$, and then you can well understand how satisfied he is with the results attained by the terchloride made by him.—I remain, sir, your obedient servant, J. S. W.

[If the pure terchloride of gold, instead of the double chloride of gold and hydrogen, or the double chloride of gold and sodium, were sold as an article of commerce, the only practical form would be in solution. How far such an experiment would succeed commercially on a practical scale, we cannot state, as there are various possibilities involved. A pure, neutral, aqueous solution, if long exposed to light, would be apt to precipitate metallic gold. An alcoholic solution would be better in this respect, and would probably answer well. But this would not give the photographer immunity from fraud where the manufacturers are disposed to be dishonest. We believe that the method described by Mr. Eliot will enable those so disposed to manufacture a pure article; but we also think that there are many sufficiently pure samples in the market to be had for a fair price. We know many commercial printers who use commercial samples, and who never or rarely experience any toning difficulties.—Ed.]

RENDERING OF COMPLEXION IN PHOTOGRAPHY.

Sir,—In the Photographic News of 11th November, at page 550, the following expression occurs:—

"To those who bear in mind that the human face is rarely of one shade, and that it still seldomer emulates shirt fronts or collars in whiteness, the lavishness with which many, even of the leading photographers, whiten the faces of their sitters appears almost offensive. But they have no choice. Neither men nor women like to be credited with darker skins than need be; and there is some excuse for them in this case, in the defects of the art itself. Photography behaves very well to youth. The white skins and purple bloom of youth fare well enough upon the sensitive plate. But when disordered livers and hot rooms have communicated a tint of yellow to the brow, and have transmuted the bloom of youth into a patch of brickdust, the silver salts are ungallant enough not only to record but to exaggerate the fact."

It is interesting when we find statements so important as the above, verified by practical illustrations. G. A. Sala, in his American article, *Daily Telegraph*, Wednesday, 23rd November, 1864, observes:—

"General George Buriton M'Clellan is very slight in stature, and bears no very close resemblance to the many photographs published of him, in which, by some eccentricity of the solar limner, he is represented as dark almost to swarthiness, both in face and hair, and with a heavy sluggish expression of countenance. His skin seemed to me almost as fair as that of a woman, his hair just brown, and his moustache quite light. In fact, he is a warm blonde; not quite tawny, and decidedly not carrotty, but what in French is termed *un chatain roux*."

The heaviness of expression was perhaps caused, in part, by bad lighting, but no doubt the swarthiness was the result of the yellow tinge of the General's skin and hair. In one of the best portraits which I have taken, in which every detail of the face is sharply and clearly portrayed, the same swarthiness is manifested and from the same cause.—Yours most respectfully, H.

29th November, 1864.

[The peculiar tint of complexion is often difficult to render by photography. But the skilful photographer, whilst admitting the difficulty, instead of succumbing to it, only regards it as rendering necessary more skill and care. There are very few cases indeed in which by judgment in lighting, exposure, intensifying, and, in fact, general management of all the materials and manipulations, the proper suggestion of complexion may not be duly rendered. The merely mechanical photographer, who treats every subject in the same manner, without a special modification to meet the necessities of special cases, will produce such portraits as that of M'Clellan, to which Mr. Sala refers. —Ed.]

THE WOTHLYTYPE PROCESS.

Sir,—Touching the recent discovery in photographic printing by Herr Wothley, I feel disposed to trespass on your valuable time with a few remarks on the result of my experiments with this new method. We are living in an age of great changes and discovery, and when it was announced to the world by the leading journal of this country that an entirely new process had been discovered, doing away with

the use of silver, I decided in my own mind that a great revolution in photography had taken place. Since that great event was announced, I have been patiently waiting for the specimen which was promised to be delivered early in November. Now we have commenced the jovial month of December, and still we look in vain for the promised land.

In the meantime I find that the photographic world have not been idle, for, from various articles in your valuable journal, I find many others as well as myself have been using their best endeavours to ascertain the real value of the invention.

The result of my efforts bring me to the conclusion that the Wothlytype process is valueless, for the following reasons:—

Firstly.—Nitrate of uranium and silver combined with collodion, as a vehicle, comes to about the same expense as our present printing press.

Secondly.—The amount of labour is about double.

Thirdly.—The fact of silver forming a part in the combination renders it necessary to undergo similar care in washing.

Fourthly.—Its permanency is equally doubtful.

Fifthly.—For sensitiveness it is nowhere compared with silver.

I tried it on a stereoscopic negative by covering one-half with uranium and silver, the other half with silver as now used, the former produced a faint print after an exposure of two-and-a-half hours, the latter a good vigorous one in twenty minutes.

Now I ask a simple question, possibly some one connected with the U. A. Photo Co. will oblige me by a reply in your columns. Why do we not receive the specimens? I have repeatedly applied direct to the Company, and have received a printed circular which says anything or nothing.

Were silver the recent discovery and uranium the old process, my opinion is, that a company possessing their pecuniary means could have produced by this time 20,000 copies, and all those perfect prints.

Of what value, commercially, can a process be that requires six weeks to enable them to supply a single copy to each photographer who may have applied for one.—Yours respectfully, George Willis,

14, *Londesboro' Terrace, Scarboro'*.

[As to the facilities of the Association for supplying prints, or the reasons for delay, we know nothing. We can readily suppose many very natural reasons why a new company undertaking a new process should meet with delays; but we know nothing on the subject. We cannot quite agree with our correspondent's sweeping conclusions on the subject of uranium printing, and chiefly because as yet comparatively little is known on the subject. We find such varying results arise from varying conditions in our experience, both as regards excellence, sensitiveness, and facility, that we hesitate to say more than that the subject is well worthy of further investigation.—Ed.]

MR. FOX'S PATENT PRINTING PROCESS.

Sir,—In a recent number of your paper I notice another instance of re-discovery, for which a patent has been obtained by Mr. T. Fox—I allude to the printing by means of dyeing materials. If you will refer to *Sutton's Photographic Notes*—Vol. 4., p. 109, April 15, 1859—you will find that Mr. Johnstone of this town has a prior claim to the discovery, as he gave a full description of his process at a meeting of the Birmingham Photographic Society. On looking over the *British Journal* for the same thing, I find the reporter has given a very different version of the matter, but he was *not* a photographer. The *Notes* report was quite correct.—Hoping you will kindly refer to the article, I am sir, yours respectfully, W. B.

Birmingham, December 5th, 1864.

[The principle of Mr. Fox's process has been frequently enunciated, and the process referred to by Mr. Johnstone at a meeting of the Birmingham Society, appears to be very similar indeed to that of Mr. Fox; and in a paper by M. Kopp, published in our present volume, p. 148, the same principle is referred to. How far these former publications will affect Mr. Fox's patent we cannot state. His paper is not so clearly stated as might be, so that we can scarcely form an opinion as to whether he may have some novel patentable point. We do not at present see any.—Ed.]

Sir,—In the Photographic News of Nov. 8th, mention is made of a new method of printing with bichromate of potass and sulphate of copper; the picture being developed with an infusion of logwood, for which process, the writer states he has obtained Letters Patent.

It is a process similar to one which I have been endeavouring to perfect, for the last three years, namely, to produce enlargements upon artist's canvas, instead of paper. The difference being the substitution of an infusion of gall nuts, for logwood; and the addition of a small portion of nitrate of silver, as parts of the sensitizing. As yet, I cannot obtain any deep shades; the whole picture being represented by light, and middle tint; but sufficiently distinct to enable me to complete a portrait on a material better adapted for oil painting than paper.

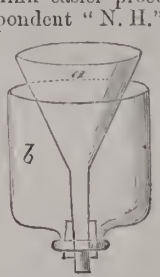
I beg to apologise for troubling you with this letter, but seeing the description of the process resembled mine, I wished to know whether the patent for the process on paper would interfere with mine on canvas.—I am, sir, your obedient servant, T. Marshall.

Kingsholm, Gloucester, December, 4th. 1864.

[As you will see from our preceding remarks, we are uncertain of the validity of the patent. But still it is, we think, sufficiently different from your process.—Ed.]

FILTERING GELATINE SOLUTIONS.

Sir,—Seeing in the News of November 28th a description and drawing of an apparatus for filtering gelatine solutions, allow me to describe one which I find most efficient, and I think easier procurable than that described by your correspondent "N. H." In this *a* is an ordinary glass funnel, *b* is a wide glass bottle with the bottom cut off (which may be easily done with a diamond, or by tying a piece of lamp cotton saturated with spirits of wine, round the place where it is desirable to separate it, when on igniting the cotton, and plunging the whole into cold water, the bottle will break evenly round). A cork is then inserted in the neck of the bottle, through which a hole is cut to admit the stem of the funnel. The whole apparatus may be placed resting in another bottle, with a sufficiently wide mouth, and hot water being poured into the inverted bottle, the gelatine may be filtered through paper, sponge, or cotton wool. When the water becomes cool, the bottle may be easily emptied by merely lifting the funnel out, and thereby allowing the water to run away.



I remain, yours, R. P. H. N.

THE DIAMOND CAMEO PORTRAIT REGISTRATION.

Dear Sir,—A correspondent in your last week's issue has taken some pains to show that we have no title to a thing which we have never claimed.

We certainly were the first to introduce the embossing of photographs with a die; but we have never advanced any pretension to the exclusive privilege of doing so.

Our registration secures to us the sole use of the *embossed design* of our new pictures: which, that there might be no mistake about the nature of our claim, we named, from the shape of the design, *Diamond Cameos*.

As these pictures are of undoubted novelty and beauty, we do not anticipate that any objection can be raised to our profiting by our own invention, we remain, dear sir, yours faithfully, WINDOW & BRIDGE.

63A, *Baker Street, W., 6th December*, 1864.

Photographic Notes and Queries.

ORNAMENTAL BORDERS AROUND PHOTOGRAPHS.

SIR,—I have forwarded by same post a few specimens of medallion cartes, mounted upon ornamentally designed photographic borders, which method I think would be much better for photographers to introduce to the public than lithographic or embossed ones, as the *whole* is a photograph still, and rendered ornamental by the aid of the artist.

As to the expense of producing them, the small extra charge the public would pay for, and if all who take would adopt the scale I shall here mention, *cheapness* would be excluded. If, then, four heads be taken on the plan of Messrs. Window and Bridges, for which I shall charge 2s. 6d., and then, according to choice, print copies at 1s. 6d. each of any of the heads, or 15s. per dozen. And I feel assured that only those would grumble at that price, who are the grumblers at the present prices.

I have enclosed you these specimens for your opinion, as I am sure you so well know the bias of the public mind in the direction of photography, and if you judge them promising of success, I shall proceed to execute them for sale to those photographers who would not design their own. One sheet of paper would print forty-five, and I should charge a certain price per sheet, which would not be over one penny each carte on an average, and photographers would save the extra paper; so they need only print a trifle over the size of the oval shape.

One other thing I wish to mention, as the designs are registered, that would to a certain extent be a bar to the portraits being registered, as they could not photograph the ornament.

Any suggestion you could think of I should feel favoured by receiving.—I am, sir, faithfully yours, E. T. BROOKS.

[We publish the letter of our correspondent, as furnishing a suggestion to those concerned. For our own part, we dislike anything in the shape of border or ornament on the photographic picture. In our estimation, the more severely simple they are in *entourage* the better.—ED.]

Newbury, Dec. 6, 1864.

PORTRAITS BY MAGNESIUM LIGHT.

SIR,—Permit me to ask Mr. Brothers, through the medium of your columns, 1stly, how he contrives to make magnesium wire of the ordinary thickness, weigh 20 grains per foot, when the average weight (taking the three thicknesses) is a fraction under 3 grains per foot, that is to say, No. 1, the finest wire weighs not quite 2 grains, No. 2, thicker wire weighs 3 grains, No. 3, the thickest, weighs not quite 4 grains? 2ndly. The utility of keeping his subject sitting still for from 40 to 60 seconds, when the wire one foot in length, suspended in the cheap lamp he recommends, will be consumed in 14 seconds at the longest, thus envolving the necessity of his sitting in the darkness, for from 26 to 46 seconds? 3rdly. Why the word patent appears on that cheap lamp, if, as he says, it be not patented?—I am, sir, yours truly, A. G. GRANT.

London, December 5, 1864.

Talk in the Studio.

ENAMELLING PHOTOGRAPHS.—Mr. A. Rollason sends us the following hints on the manipulations in his patent enamelling process: they will also be found of service in connection with all similar processes. 1st. When the pictures are taken off the plates in the usual way, the best cement which can be used for mounting them is Russian glue, it soon sets, and does not penetrate the back of the print like starch or paste. 2nd. When the pictures are dry, they may before removal be coated over with two or three coats of thick collodion, allowing each coat to dry before another coat is applied, this will also prevent any moisture attacking the back of picture. 3rd. When it is desired to mount the picture, before taking it off the glass, the following is the method I have found most successful. Let the mounts be soaked in water and placed on each other, so as to be kept thoroughly damp and ready for use. Have a solution of gelatine also in stock, of the strength of one part of gelatine and six of water. Have some white foreign post, cut a little larger than the mounts. When required for use, the solution of gelatine must of course be warmed sufficiently to reduce it to a fluid state, and not beyond this. Immerse the paper into a solution of gelatine, and with a flat camel-hair brush flood the back of the picture on the plate, either before or after it is quite dry, then place on the paper, adjusting it of course, examining for air bells, &c., after which allow thoroughly to dry. Finally rub over the extent of the paper with paste or glue, and also the damped mount, and place upon the paper, pressing down gently, adjusting, &c. When quite dry, cut them off in the usual way. Any printing may be done on the foreign post, or any other paper used, but this I have found the best.

BLISTERS IN ALBUMENIZED PAPER.—A correspondent says, that having met with a sample of paper which blistered very much, he found that on using a bath consisting of 15 grains of nitrate of silver, and 70 grains of nitrate of soda to an ounce of water, with a drachm of spirits of wine, fuming with ammonia, and adding to the fixing bath spirits of wine one ounce to ten of solution, the blisters entirely disappeared.

AWARDS OF THE ROYAL SOCIETY.—At the annual meeting of the Royal Society, held on Wednesday week, a Royal medal was awarded to Mr. Warren Delarue, F.R.S., for his successful application of photography to the recording of celestial phenomena.

SHEFFIELD PHOTOGRAPHIC SOCIETY.—We have always pleasure in witnessing the spread of photographic knowledge, and are glad to find that a new society has just been started under very favourable circumstances, and with every prospect of success in Sheffield. The first meeting was held on the 1st of this month, when the following officers were elected. President, Mr. John Ryan, M.D.; Vice-Presidents, Messrs. F. T. Griffiths, M.D., and C. J. Flemming; Council, Messrs. G. W. Kirby, L. F. Peacock, J. Thomas, and J. Tulley; Treasurer, Mr. Theophilus Smith; Hon. Sec. Mr. J. H. Rawson. The meetings are held on the first Thursday in every month.

THE "STANDARD" ON MAGNESIUM LIGHT.—A recent leader in *The Standard* anticipates the time when the magnesium light shall supersede gas. On its photographic use the writer says:—Let the question of price be once overcome, and magnesium possesses unrivalled recommendations, such that no other light can possibly compete with it. The photographers have already seized upon it, owing to its extraordinary chemical power. It is not a small thing to be able to record that photography is no longer dependent upon the action of the sun. The sky may be laden with yellow vapours, or may be invested with the blackness of midnight—the photographer can still "pursue the even tenor of his way," and fix his negatives with perfect ease. In fact magnesium beats ordinary English daylight out of the field, and henceforth the gentleman who takes our portraits in a camera may meet us on the ground-floor, or even conduct us down into the cellar, and spare our legs the toil of climbing to the region of the chimney-pots, where photographers have hitherto been wont to build their eyries. But a more general interest may be taken in the fact that the magnesium light exhibits all coloured articles in their true tints—the same as daylight. Not even straw colour changes, and the most apocryphal blue or green can be examined as satisfactorily as in the open day. We may also refer again to the valuable property of the magnesium light in throwing off no deleterious vapour, thereby delivering us from a fruitful source of damage to health, furniture and goods. It is, in fact, a "perfect" light—we only want it cheap, and he who cheapens it will be a benefactor to mankind, whatever the gas companies or the petroleum people may say to the contrary. Even supposing that magnesium

should not readily compete with gas and oils for the more ordinary purposes of combustion, it is obviously applicable to some very important purposes. It may ultimately change the whole character of photography, by giving it all the certainty and compendiousness of printing.

To Correspondents.

CASTLEBERG.—We believe the photographer of R recently-issued pretty little card, entitled "Red Riding Hood," is a Brighton photographer. We do not remember his name, nor that of the publisher; but there have been several with the same title. 2, The photographs mentioned in our pages as registered through our publisher are chiefly cards, but they include all sizes.

J. A. F.—"The Smile" and "The Frown," are copyright pictures. "Reading the Will," we believe, is not. But in no case that we can see is it right to copy another person's picture without his permission.

G. FOX.—Experience is the only guide to a knowledge of proper fixing. There are no certain signs by which you can see, and no certain tests you can readily apply, although there are several which may aid you. The best guide is taking proper care to keep on the safe side. See an article on the subject in our last YEAR-BOOK. 2. Starch or good glue; both answer well for mounting. 3. You can scarcely hope for a really good whole-plate portrait lens for £5, but the maker you name is perhaps as good as any of the French makers.

B. VIVIAN.—The best recent brief history of photographic progress is that in the *Quarterly Review*, from which we have given copious extracts. Hunt's work on Photography and Lake Price's work, contain excellent epitomes of the early history. "The Annals of Photography," in our last half dozen YEAR-BOOKS, also contain every particular worth recording.

H. D. ATKINSON.—A good negative should show some of the general forms of the picture by reflected light. A negative which shows nothing but a drab surface by reflected light, but has proper gradations by transmitted light, may often give good prints but it is not the best class of negative. In the YEAR-BOOK which you have just received you will find the characteristic of a good negative described. Over-exposure and over-development cause the burying of the image, so that it is only seen by transmitted light. You will also find the formulæ you require in the YEAR-BOOK. The addition of common salt to a nitrate bath will throw down silver as a chloride. It altogether depends upon the quantity you have added as to whether the bath is of further use. A little will not do much harm, but you will easily ascertain by trying the bath. The rapid discolouration of the paper after silvering is generally caused by some defect in the paper. We have not seen any successful attempt at portraiture in Photo-lithography.

PHOTOGRAPHER.—We prefer No. 2; but it is probable that No. 1 will be a good instrument. We are obliged by your kind remarks, and are glad to afford you so much pleasure. It is satisfactory to succeed in an endeavour to which we devote our life.

RUFUS.—In the case to which you refer we believe the focus is measured from the back lens to the ground glass. The reference to the distance means that the sitter and the lens must be that distance apart to produce a full-length figure of the usual size on a card. 2. We cannot tell you the exact extent of the field covered by the lens in question, but probably 5 by 4 when well stopped down. It will take landscapes and copy pictures. 3. The sliding shutter in the dark frame posseses a hinge, and folds back in the camera. 4. The "carrier" is a small frame with corners, on which the plate rests. 5. Silver wire is the best material for such corners, and is generally used.

R. P. H. N.—We are obliged for the ingenious suggestions. It shall appear in our next.

LUCEM, Aberdeen.—Old iodized collodion is not suitable for enamelling photographs; but if used the paint should be washed or soaked for a while in water to remove the sensitizing salts and the colour they cause. 2. Gelatine solutions will keep in cool weather if kept in well stopped bottles. 3. A white deposit in the silver bath used for paper is probably chloride of silver, caused by salt from the paper. 4 The addition of alcohol to the silver bath tends to keep the paper and the bath from discolouring. One part in seven or eight of water will serve.

AN AMATEUR.—We have used both *Saxe* and *Rive* paper in our experiments, and have preferred the Saxe. 2 We have given the formulæ in recent numbers. 3. We believe yes, but we don't know.

G. W. R.—The process for taking transparencies on albumen is much too lengthy to give in this column. We have given many articles on the subject in former volumes of the NEWS. You will find full details at p. 265, PHOTOGRAPHIC NEWS, Vol. v.

W. GURR.—In a glass room 26 feet long you can use a lens of about 8 inches, equivalent focus for card pictures with advantage. 2. We prefer the first of the two names. 3. You may take the four portraits as arranged in the diamond cameo without doing wrong so long as they are not made convex.

DARBY KELLY.—It is more than probable that the majority of the prints in question are copyright. We cannot give you any general advice on the subject. The only safe way is to get permisssion from the publishers.

WINDERMERE.—The new plan you propose will, we have no doubt, work very well; but unless your old room is unsatisfactory, we don't see any reason for altering. If you merely wish to get more length, that might be done without altering the arrangement of light.

J. A. L., Bath.—The only mode in which you can ascertain whether pure or methylated ether has been employed in the manufacture of a sample of collodion is by the smell, and it requires considerable experience to detect it. 2. We cannot tell you, as we have not examined them for the purpose of ascertaining. We do not regard methylated ether as any disadvantage. 3. We prefer the second in the list of names you send. Thanks for the hint, which we will use.

G. R. B.—You will find a compendious description of the uranium printing process in our forthcoming YEAR-BOOK, as well as of all other printing processes which have come under our attention during the year. We have succeeded best with Saxe. Pin the paper on a board, letting the paper project at one end, and coat as a glass plate. The uranium may be mixed with alcohol by pounding them together in a mortar. A few drops of water or weak spirit, and the same treatment, will dissolve the nitrate of silver.

A. Z.—We prefer the saccharo-sulphate of iron. You will find detailed formulæ, and the respective results, described in an article on page 87 of the present volume, and also in the forthcoming YEAR-BOOK.

F. LILLY.—The two pictures on a stereoscopic slide are not alike. They just differ as much as the images seen by the right eye and the left.

J. C. S.—Chloroform, benzole, or bisulphide of carbon will dissolve india-rubber. The two first are best, as the latter smells unpleasantly.

G. B.—Our pages have abounded recently with articles on pinholes. You will find many suggestions for getting rid of them in the present volume, and also in our forthcoming YEAR-BOOK. They proceed from a variety of causes, too numerous to enter into in this column.

A SUBSCRIBER FROM THE COMMENCEMENT.—Both those you name have the reputation of being very good, and one we know is so if pictures produced by it are any evidence. A bath is not improved by using various collodions in it. It is probable that all those in your list are good; but we should select 1, 5, or 9.

F. D.—The best improvement you could have made would have been the raising of the roof at the eaves about two or three feet. With your present form it is not likely that any obstruction of light causes flatness, but the imperfect arrangements. The new room gives you excess of direct front light, and requires a carefully-managed system of blinds to control it. To avoid flatness, you require more shadow, and that can only be gained by means of blinds. We should recommend you to get a complete system of blinds before making any more alterations.

L. M.L.—We have occasionally met with such spots before, but not often; but we are uncertain of the cause. They may proceed from imperfect fixation, caused by the presence of some injurious substance in the paper. We have once seen such spots caused by particles of citric acid being scattered on the print, whilst the hypo was in it. 2. You may practise the enamelling processes described in our pages without fear.

LUX.—The *Philadelphia Photographer* is published monthly, and commenced at the beginning of the present year. The photographs are generally very charming views, of about 6 by 4, mounted with india tint. The price of each number is 1s. 3d The postage is costly, and the prints often get injured, so that you will find it more prudent to obtain it through an American bookseller, such as Trübner. It is published by Bennermann and Wilson, of Philadelphia. 2. We have found a Saxe paper best.

H. J.—The examples you forward, enlarged and very much lighter printed, might do; but a wider angle, containing more subject and variety, would do better.

A. S. WATSON.—If the gentleman for whom your letter is intended be the photographer, he has been dead, we regret to say, for over two years. Several correspondents will receive attention in our next.

THE GLOVER FUND.

OXONIENSIS forwards us One Guinea for this fund, which shall be forwarded to the proper quarter.

Photographs Registered during the Past Week.

MR. ALFRED MOORE, 2, Ethelbert Terrace, Margate,
Three Photographs of Rev. C. T. Astley, M.A.

MR. JAMES BURKE, 44, Lower Ormond Quay, Dublin,
Photograph entitled "Bringing Home the Bride."
Photograph entitled "Birth of an Heir."

MESSRS. W. AND D. DONNEY, 9, Eldon Square, Newcastle-on-Tyne,
Photograph of Rev. Mr. Spurgeon.

MR. HENRY ROBINS, 14, Surrey Street, Landport, Hants,
Photograph (from Water-Colour Drawing) of Surrey Street Chapel, Landport.

MR. CHARLES MONSON, 12, Bridge Street, Northampton.
Two Photographs of Rev. James Mursell.

MR. ALFRED PETTITT, Gallery of Fine Arts, Keswick, Cumberland.
Two Photographs of Margrett Beattie, aged 105 years, Postlone, Cumberland.

MESSRS. HENRY MEDCALFE and THOMAS EVANS, Quay Hill, Tenby, South Wales.
Photograph—Interior of King Cormac's Chapel, Rock of Cashel.

MISS MARGARET HOULSTON, 346, Egerton Terrace, Stratford New Road, Manchester.
Photograph of Dr. William Fairbairn, F.R.S.

MR. W. B. MICKLETHWAITE, Crawley Lane Cottages, Heckmondwicke, Yorkshire.
Three Photographs of John Bruten Morte, sen.

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THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 328.—*December* 16, 1864.

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BLURRING AND NUBATION.

WE are not going to revive the discussion on the phenomena to be designated by these terms. The subject is an interesting and important one, but it has now been discussed *usque ad nauseam*. Major Russell has done some service to photographers in demonstrating a fact before stated, but not generally recognised, that under certain circumstances some of the light which reaches the collodion film, when it is very thin and translucent, passes through it, is then reflected back again, and causes a fogged effect on those parts of the plate on which it falls. We had never met with the defect, to our knowledge, in many thousands of plates which we had exposed; but the explanation is simple: we always use thick creamy films. We have always laid it down as a most desirable, if not an imperative, condition of success, both as regards sensitiveness and quality of the negative, that the collodion should be of good body and give a creamy film. At the outset of this controversy we tried in various ways to obtain the effect by the means which Major Russell described, looking, however, for a blurred or imperfectly defined image. We coated several plates on both sides with collodion, and having excited the plate and given it a good exposure, developed both sides, to ascertain if there were any appearance of light having passed through the first film. But we found no such result, and we declined to accept Major Russell's position. The reason, we now see, was clear enough. We used a thick opaque film, and Major Russell used a thin translucent film. Moreover, by the term *blurring*, we understood the production of an imperfectly defined or partially obliterated outline; whilst Major Russell meant the production of a fogged effect by reflected light. We conceive that the best remedy for the defect to which Major Russell was really addressing himself, is that which Mr. Hughes has found successful in practice, and which Mr. Hislop, Mr. Hill, and other successful dry-plate men at the recent North London Meeting pointed out as the best condition for success in both wet and dry processes generally, namely, the use of a thick creamy film. But where these translucent films are concomitants of other desirable advantages, as in some of the processes with which Major Russell has been recently engaged, he has satisfactorily proved that the evil spirit in question may generally be exorcised by the application of a yellow or red pigment at the back of the plate.

Our chief object is now, however, to add a final word of explanation on the terminology which has recently been discussed. We have objected to the word *blurring* as not defining or describing in any sense the defect in question. In the absence of any term by which the defect was generally known, we have accepted the word *nubation*, as suggested by Mr. Shadbolt. Mr. Hughes, in his remarks at the North London Meeting, ably pointing out the confusion which must ensue if the use of such a misleading mis-nomer as blurring were continued, also stated his willingness to accept the term *nubation*. But we are not less puzzled than surprised to find a contemporary fixing the parentage of the word upon Mr. Hughes. With the dispassionate impartiality which is attained by totally ignoring all the facts and history of the subject, he affirms that the defect in question has always been known as blurring, and quotes Mr. Shadbolt as an authority for the use of the term. Now, although we revived the use of the term *nubation*, we do not claim its origin, nor can Mr. Hughes in any sense be charged with its sponsorship. We are compelled, therefore, once more to refer to the early facts of the case. When Major Russell first called attention to the subject, we pointed out that the theory was not a new one, but was brought before the London Photographic Society in 1861 by Mr. Marlow, who used the term *halation*. At that meeting Mr. Shadbolt pointed out the fact that the phenomenon described was not halation, but *fogging by reflection*, the word halation being already appropriated by a very well-known and well-defined phenomenon. In a leader in the following number, for April 15, 1861, of the journal of which he was then Editor, Mr. Shadbolt defined the defect then under discussion as "a haze or fogging of greater or less amount, extending from the high lights over a portion of the shadows or darker parts of the picture," and pointed to the effect surrounding windows in photographs of interiors in illustration of the definition. He then gives the term *nubation* as "sufficiently appropriate and descriptive;" and concludes his article by an allusion to "nubation, as we propose to call it." It is somewhat singular that our contemporary recently quoted the very words used in this article, which we have quoted above as describing the defect in question, and states that this was Mr. Shadbolt's definition of *blurring!*

As to the origin of the term *blurring*, as applied to the defect in question, we have no evidence; but it is somewhat singular that we find it used as referring to an imperfectly-defined image in an article by Mr. Rothwell in our contemporary, who distinctly refers to the reflected light theory *at a date anterior to the reading of Mr. Marlow's paper*. Putting forward a theory, as to the action of rays of light not brought to a focus producing, in long exposed pictures, imperfect definition, Mr. Rothwell says, this 'produces a blurred picture because the erratic light from one point overlaps that adjoining, thereby acting and re-acting in a manner highly detrimental to the general excellency of the result. In accounting for this evil, perhaps something may be allowed for light which, after having passed through the film, is reflected from the back surface of the glass plate; but such action must be very small indeed."

Mr. Sutton has been rated for having said he first met with this idea in the course of reading, instead of distinctly accrediting it to Mr. Marlow. It is quite possible, and,

indeed, probable, that since this article appeared before Mr. Marlow's paper, Mr. Sutton and some other persons met with it first in the course of reading.

In regard to the term *nubation*, it has been objected that the defect in question has nothing to do with the clouds whatever. Possibly not; nor has a foggy plate necessarily anything to do with foggy weather. But a name may be quite as happy when it describes a result as when it indicates a cause. In the defect Mr. Shadbolt styles *nubation*, a clouded or hazy effect is produced, as in fogged plates a foggy effect is produced. If a better or more descriptive term can be found, by all means let it be adopted, if it have not been already appropriated to some other distinct pheuomenon. But it any case, we regard the abuse which has been heaped upon the word *nubation* as unfair to the gentleman who first sanctioned its use, and not the less so that the strictures appear in the journal which he for many years so ably conducted. It is probable that the matter now but little disturbs his equanimity; were it otherwise, we might well exclaim, with Byron:—

> "Keen were his pangs, but keener far to feel,
> He nursed the pinion that impelled the steel."

BUNSEN AND ROSCOE'S PHOTO-CHEMICAL RESEARCHES.*

1. *Silvering the Paper.*

PIECES of the same perfectly homogeneous salted paper, of a quality such as is usually employed by photographers, prepared according to a method hereafter described, were allowed to lie for two minutes upon the surface of silver solutions of different strengths, as follows:—

Paper *a* on a solution contaiuing 12 Ag NO_3 to 100 of water.
" *b* " " 10 " "
" *c* " " 8 " "
" *d* " " 6 " "

The papers were then air-dried in the dark, exposed for one and the same time to the daylight, and their shade determined. The following numbers were obtained:—The readings A were made by one independent observer, the readings B by another; and each number is the mean of several readings. Equality in the numbers denotes equality in the shade, that is, equality in the sensitiveness of the paper.

EXPERIMENT IV.

INTENSITY No. 1.

Parts of nitrate of silver to 100 of water.	Observations. A.	Observations. B.
12	128·6	129·7
10	128·7	127·0
8	128·7	128·0
6	129·7	130·0

INTENSITY No. 2.

Parts of nitrate of silver to 100 of water.	Observations. A.	Observations. B.
12	125·5	125·0
10	125·5	125·5
8	125·4	124·2
6	161·5	160·2

INTENSITY No. 3.

Parts of nitrate of silver to 100 of water.	Observations. A.	Observations. B.
12	110·0	110·0
10	109·5	109·3
8	109·6	109·3
6	119·0	120·0

INTENSITY No. 4.

Parts of nitrate of silver to 100 of water.	Observations. A.	Observations. B.
12	90·6	90·0
10	88·0	88·3
8	90·7	89·4
6	89·6	89·0

From these numbers it is seen that the sensitiveness of the paper remains unaltered when the concentration of the silver solution varies from eight to ten or twelve parts of nitrate of silver to 100 of water, but that when a solution containing six parts of this salt to 100 of water is employed, the point at which alteration occurs is approached.

The influence of the concentration of the silver solution having thus been determined, it was next necessary to examine the dependence of the sensitiveness of the paper upon the length of time during which it remained upon the silver solution. For this purpose, pieces of the same homogeneous salted paper were laid for various times upon the surface of a silver solution containing twelve parts of nitrate of silver to 100 of water:—

Paper *a* silvered for ¼ of a minute
" *b* " 1 minute
" *c* " 8 minutes

On determining the shades of paper thus prepared and insolated for an equal time, the following results were obtained:—

EXPERIMENT V.

INTENSITY No. 1.

Duration of the silvering.	Observations. A.	Observations. B.
′ ″		
0 15	140·6	140·5
1 0	139·0	140·0
8 0	139·6	139·0

INTENSITY No. 2.

Duration of the silvering.	Observations A.	Observations B.
′ ″		
0 15	91·0	91·0
1 0	91·5	90·5
8 0	91·5	92·0

INTENSITY No. 3.

Duration of the silvering.	Observations. A.
′ ″	
0 15	45·9
1 0	47·1
8 0	45·0

INTENSITY No. 4.

Duration of the silvering.	Observations. A.
′ ″	
0 15	89·9
1 0	90·0
8 0	89·2

Hence we may conclude that the time during which the paper lies on the surface of the silver bath can vary from fifteen seconds to eight minutes without any difference in the sensitiveness of the paper being noticeable.

If the duration of the silvering be shortened below the fifteen seconds, a film of chloride of silver is obtained which is much less sensitive than that obtained by a longer silvering.

It appeared to be of special importance to determine by experiment how long a silver bath can be used without the quantity of nitrate of silver being reduced below 8 parts to 100 of water, at which point the sensitiveness of the paper may begin to alter. We found that when a paper was silvered, rather more nitrate of silver than water was removed from the silver bath; that, however, two-thirds of a solution containing 12 of nitrate of silver to 100 of water may be used up before the quantity of silver salt sinks from twelve to eight. One square decimetre of paper does not absorb more than 0·01 grm. of nitrate of silver from a solution of the above strength.

Not only a diminution in the silver occurs on using the silver bath, but likewise a formation of nitrate of soda takes place, which might by its presence, affect the sensitiveness of the paper. We have therefore compared a freshly prepared silver bath with one which had been long in use; and the results of this examination are seen in the following tables, and show that the occurrence of the nitrate of soda produces no effect upon the sensitiveness of the paper.

EXPERIMENT VI.

Silver solution.	Intensity No. 1. A.	Intensity No. 1. B.	Intensity No. 2. A.
Long used.....	130·2	130·8	73·0
Freshly prepared	130·0	131·5	73·4
Freshly prepared	130·8	130·9	73·2
Long used.....	130·0	130·3	74·0

The next series of observations show the length of time which the silvered paper may be preserved in the dark before insolation without alteration of its sensitiveness. The paper employed was silvered in a solution containing 12 parts of nitrate of silver to 100 of water.

From the tables which follow it appears that paper kept from one to fifteen hours gave results with little variation of character.

* Continued from p. 561.

APPLICATION OF THE ELECTRIC LIGHT TO ENLARGING NEGATIVES.

BY A. L. NEYT.

In a recent number of your journal I find an article in which one of your readers asks for information on the application of the electric light to enlarging apparatus. Having had some experience in this matter, I hasten to my fellow-enquirer to communicate the results which I have arrived at.

The application to which he refers is not only possible, but gives very good results. The cost of a small apparatus amounts to 1,000 or 1,200 francs. The cost of the production of proofs depends entirely on the quantity produced; that is to say, if the electric light be employed at rare intervals of time, once a week for example, the expense of acids and the time required to put the pile in working order, mounting, cleaning, &c., is very considerable, and causes much trouble.

If, on the contrary, a frequent application of the apparatus be made, the expense is comparatively insignificant, and the acids may serve several times. If the work to be done in enlarging be very extensive (by an operator who makes enlarging a speciality for instance), we can advantageously replace the carbon pile by the inductive coil (Nollet's), which has been in operation during several years at the *Invalides*, at Paris, giving very good results. It costs 4,000 francs, but it has the advantage of being always ready to work, and requires no preparation either before or after working. One man is sufficient to put it in operation.

If this machince, as may be supposed, is too costly for most operators, the pile must be adopted. The following is a list of the apparatus I employ:—

1st. A battery of 60 Bunsen elements, at 5·50 francs each, large size, by Duboscq, of Paris. I place the battery on a glass slab to avoid loss in the electric current.

2nd. A regulator for the electric light, 250 francs.

3rd. A photogenic lantern to contain the above, 250 francs. M. Duboscq constructs the whole of this apparatus with the greatest care, and with a thorough knowledge of the object in view.

Now, if we employ a solar camera, constructed on Dr. Monckhoven's system, we add to the above a collecting lens to condense the solar rays upon the negative to be enlarged; a system must be contrived which will throw parallel rays upon the collecting lens, like those of the sun, the electric lamp emitting divergent rays. There are two ways of attaining this result. If the enlarging apparatus be of small dimensions, say with a collecting lens of three inches diameter, one converging lens will be sufficient. It is placed in such manner that its principal focus lies between the carbon points of the electric lamp, it will then send a cylinder of parallel rays. If, as is most probable, the apparatus be of larger dimensions, a parabolic reflector of silvered glass or silvered copper must be substituted for the lens, and placed behind the lamp. This is less advantageous, because the anterior light remains partly divergent, but I believe that it presents no serious objection. The application of a lens will always be better, but entails greater expense.

When preparing for continuous work, the battery is arranged as follows;—Beside the glass table place two earthen pans, each large enough to contain thirty porous jars of the elements.

The jars filled with acidulated water remain fixed upon the table. Nitric acid is poured into the pans to the depth of nearly two centimetres (1½ inches), and the porous jars are filled to that depth with this acid, being at the same time surrounded by it. Favoured by the porosity, we are sure that each jar will be filled to exactly the same height.

This done, we place the zinc poles in the jars of dilute sulphuric acid. Then the porous vases become active one by one, and after working a few minutes are made contact, and the battery is in a state of activity. The operation concluded, the vases are removed from the nitric acid and replaced in the earthen pans, where they remain full, the levels are re-established, and all is ready for the next day's work in a few minutes. We thus obtain a steady current during eight hours, with an expense for acids of ten francs. The acids will serve several times, as they can be strengthened by new acid. When they become too weak for use, they will still be worth something.

The intensity of the electric light is about one-fifth of that of the sun. Thus, what a Monckhoven enlarging apparatus will yield in half an hour will require with the electric light two-and-a-half hours. Therefore, we must never think of employing it when sunlight is available. But how seldom can we reckon upon a clear sky.

By increasing the number of elements in the battery we obtain a proportionate increase of light.

I have also applied the oxyhydrogen light, and although it is much cheaper and easier to manage we must not think of it. Although more actiuic, perhaps, in equal volume, it is too weak as a whole; besides, the luminous surface is too large, which injures the sharpness of the picture.

I have been too prolix in my details, perhaps, but I wished to give you a complete account of the results of my researches, from which you may extract as much as may be useful to your correspondent,

Gand, 3rd December, 1864.

ON THE TANNIN PROCESS.

BY JABEZ HUGHES.

The tannin process was first described about three years since in the sixth edition of "Hardwich's Photographic Chemistry." Its merits was quickly discovered, and it soon came into general use. The author, Major Russell, has been most untiring in his exertions to perfect it; and in his book on the subject, as well as in his numerous contributions to the photographic journals, he has laboured hard to remove the difficulties to its successful practice. The result is that the process has gradually displaced most others, and at the present time it may be considered the most popular method of producing dry plates. Like every process that has had general recognition, there has been a desire to improve it; hence a variety of modifications, alterations, additions, and variations of the original formula. These have often consisted in adding some other substance to the tannin, to improve its original goodness. With this view, honey, malt, glycerine, albumen, gum, sugar, gallic acid, pyrogallic acid, and many other substances have been proposed. Without calling in question the propriety of these additions, I propose to invite your attention to the merits of the original process in its primitive simplicity.

The process has pleased me very much by its simplicity and certainty; it has also another recommendation, namely, that, except the solutions of tannin and carbonate of ammonia—both of which are easily made, and will keep any time—there are no chemicals required but such as are necessary for the ordinary wet collodion. There is no getting a lot of unusual things about you just when you want to prepare your plates, no beating up of white of egg, no dissolving of gelatine, no sending out for this or that which you may not obtain; the ordinary materials indispensable for amateur or professional work can at once be used without preparation.

The collodion I have employed has been such as is fitted for ordinary negative portraits; that made by myself, containing 4 grains of an iodide to 1 grain of a bromide, has answered well. I have also used Mawson's, both alone and mixed with my own, with equally good effect. I think any good commercial bromo-iodized collodion will answer, provided it works well in the wet process, and gives a dense creamy film. I confess to a partiality for creamy films; in the wet as well as the dry process, I think they are exempt from many of the evils to which more transparent films are prone.

I am aware that, in expressing my approval of a collodion containing a much larger proportion of iodide than bromide, I am at variance with those advanced workers in tannin, Major Russell, the late and esteemed Mr. Glover, and Mr. Sayce: but I know these gentlemen will exonerate me when I say that I do not urge my mode of working as being better than theirs, but I am only narrating my own experience. I am quite open to correction, and desirous of information. As yet I have not experimentally compared the results of an almost exclusively bromized collodion, such as these gentlemen use, with the usual bromo-iodized one employed by myself. I hope to have that pleasure, when, if I am convinced of its superiority, I will willingly abandon my present practice; but, in passing, I must confess that I am not prepossessed with my few attempts with an exclusively bromized collodion.

I have not found it necessary to use any coating of gelatine or india-rubber to my plates before collodionizing, as the films have remained intact during all the necessary washings. I simply coat my plate in the usual manner, using a pneumatic holder, and allowing the collodion to flow to all the corners; when the film is set, the plate is immersed in the usual 30 or 35 grain nitrate-of-silver bath, such as is prepared for taking portrait negatives. The bath is faintly acid. I have prepared plates in a bath containing as much as one drop of strong nitric acid to each ounce of solution; and, though I did not gain the advantage I sought in the experiment, I am not aware that the plates prepared in the bath were any the worse for the extra quantity of acid: from this I conclude that a considerable quantity of acid may be present in the bath without being prejudicial to the dry plate.

The plate is allowed to remain the usual time in the bath; when sensitized, and all apparent greasiness removed, it is taken and immersed in a dipping-bath of distilled water. In this it is allowed to remain until another plate is sensitized, then washed for about sixty seconds under the tap, next flowed over with a 15-grain solution of tannin, and in this state set aside to dry.

These operations, thus easily described, are almost as easily performed; yet a few words in explanation will be in place. If, instead of putting the plate in distilled water when it comes from the bath, it be washed direct under the tap, it will certainly not turn out satisfactory, as there will be an irregular formation of chloride and carbonate of silver in and on the film. Immersion in a dish of common water will not be much better; but by first soaking the plate in distilled water, the greater part of the nitrate of silver is dissolved out, and the remaining washing can be done by common water. It is well to change the distilled water from time to time; how often, depends on the size and number of the plates, as well as on the quantity of distilled water employed. In sensitizing my usual size plates, 10 × 10, I change the water, about eighty ounces, for every six plates.

I have said, wash the plates for sixty seconds under the tap after coming from the distilled water. You may say, why sixty seconds? and why not longer?

Well, I do not find any advantage in prolonged or excessive washing, but often a disadvantage; it is sufficient if the plate is washed enough. If the plate is insufficiently washed, when the tannin solution is poured on, the film will turn brown. The first place where this *browning* takes place is at the thickened edge of the film, where the collodion was poured off. This is the place to look to judge of the sufficiency of the washing; if this portion of the film keeps its pure colour, it is washed enough; if it turns brown, more washing is necessary, and very probably the distilled water requires changing. If this browning is confined to the thickened film on the edge, the plate may be safely used; but not so if the colour has extended over the film.

The evil tendency of overwashing is to produce fog. This is a statement for which one is scarcely prepared. That deficiency of washing should produce fog seems feasible; but that excess of washing should cause it appears very singular. Yet sufficient testimony of independent workers has accumulated to consider this point settled, that is, so long as a collodion is used containing a bromide. Major Russell has given an ingenious, and, I have no doubt, correct explanation of this circumstance, and to those who are specially interested, I refer them to the Major's recently published articles on the subject; but, as the discussion of it can be dispensed with on this occasion, I pass on with the recommendation not to wash the plates longer than is necessary to prevent browning of the film on the application of the tannin.

I have named a 15-grain solution of tannin: it is probable that other degrees of strength may at times be desirable; but having succeeded so well with this strength, I have thought it good to adhere to it. I have found samples of tannin differ, not only in solubility, but in other qualities; I therefore suggest, when things do not work well, to try a different sample of tannin. It is important that the tannin-solution should soak well into the film, so that all parts are equally imbued with it: unless this is done there will be marks and stains in the negative. I have generally held the plate with a pneumatic holder, and poured on the solution, allowing the first portion to flow off, carrying with it the surface water; a second portion has then been poured on, which I have allowed to flow backwards and forwards until I have thought it incorporated with the film. More recently I have adopted the plan of immersing the plate in a dish containing the solution of tannin, and allowing it to remain soaking until the next plate was ready. By this means all risks of stains and draining-marks are avoided. I intend trying a dipping-bath, as being a very convenient mode of immersing; and I think the tannin solution may be used indefinitely by occasionally strengthening and filtering it.

I have tried washing off the tannin before drying the plate, but have not been so well satisfied with the nature of the image. I have therefore returned to the original instructions of allowing the tannin to dry on the plate.

I have not used artificial means for drying. The plates are prepared in my dark room in the evening, and resting on folds of blotting paper, either in the rack or against the wall, remain unmolested till the morning, when they are found to be dry. The edges are then varnished, about an eighth of an inch all round, with the common asphalt black varnish used for glass positives, which answers remarkably well.

The plate is now ready for exposure; and to the natural question that may arise, "How long will it keep?" I can only give the innocent answer, "I don't know."

I have ordinarily used the plates soon after being prepared, say within a week or ten days: and the longest time I have kept them has been about six weeks: to that time they were quite perfect, and I know no reason why they should not keep much longer.

I have no doubt that zinc or mahogany is the best to keep them in; but I have used only the regular deal plate-boxes, and I am not aware that I have suffered by the practice.

(To be continued.)

ON PRINTING WITH SALTS OF URANIUM.

BY H. COOPER, JUNR.*

Since I took up photography as an amusement, my object has always been the improvement of the printing, both in its artistic and manipulatory phases. It has generally happened that when I have been most sanguine of success I have been most disappointed, so that now I receive with some doubt any innovation, until its capabilities have been ascertained to some extent. Although I am rather dubious of the great advantages claimed for the new Wothlytype prints, I am certain that

*Read at a meeting of the London Photographic Society, Dec. 6th.

the process contains the germ of many a useful alteration in our present modes of working. The disappointment of photographers has been so great, upon finding that the process is so wanting in striking novelty, and also that the use of silver has been retained in it, that they are very apt to overlook some very great beauties in the process, and to refrain from "putting their shoulders to the wheel" to remove some of its existing defects, as it is only by the united and yet independent labours of several experimental and practical men that a process can be brought to perfection.

It was with very great reluctance that I was compelled to abandon for the present the carbon process. I say "for the present," as I have great hopes that at a time not very far distant we shall be in possession of a perfect carbon process, simple and certain. However, carbon is not our subject for this evening, but I hope to have something to say on some improvements in Swan's process in a month or two.

During the last few weeks, I have been experimenting as extensively as possible with uranium printing; but, as in so short a time, it is absolutely impossible to carry out the hundreds of necessary experiments in each branch of the process, before the conditions most conducive to success can be laid down, I must ask you to accept this paper as an instalment of what I intend doing in this direction. All we can do at present is to record and compare the results we have each obtained, and attempt to deduce a few general principles, and thus aid the development of the capabilities of the process. The first and *most important* point is the paper, as it is almost entirely upon the paper that the quality of the finished picture depends. I have hardly met with a single perfect sheet at present: I have principally used a *Rive* paper, No. 47, which I had found to give the best results in my earlier experiments in printing. I am, however, far from satisfied with it for uranium printing; and although no definite conclusion can as yet be arrived at, I hear that those who are experimenting for the Association give the preference to the *Saxe* papers. The necessity for a suitable paper is of much more importance than for albumenizing. Nearly the whole of my later failures I can trace to imperfections in the paper, the principal evil being a terrible mottling. If a mottled picture be held up to the light, each inequality of tone will be found to correspond with marks in the paper; and, again, if the collodion be stript from the print, you would be surprised to see what a very imperfect picture the paper itself contains; and the most vexing part of the matter is that, even when we think we have at last got a perfect paper, we shall doubtless find many sheets in a ream very far from being up to the mark.

I have seen and heard many complaints of the delay of the Association, and I think I break no confidence by stating that their great difficulty has been in procuring a suitable paper. I hope, however, that now the difficulty stands a good chance of being overcome, as I have received a sample of paper from Colonel Wortley that gave very excellent results. As regards the sizing of the paper, my experiments have been very successful, doubtless on account of my having given, during the last three years, much attention to the sizing of photographic papers. I have used for uranium printing, gelatine, gum arabic, gum tragacanth, and arrowroot. The last is the one that possesses the necessary qualifications in the highest degree. The collodion film adhering much more tenaciously to a paper sized with a starch, than with any other material I have tried, and starch seems to be the most suitable form of organic matter to facilitate the disruption of the oxygen and uranium under the action of light, and to give greater brilliancy to the reduced silver. But here again, fresh difficulties arise, from the fact that very seldom can two samples of arrowroot be found to yield precisely the same results. I must give the preference to the St. Vincent arrowroots, and I have from a good authority that these arrowroots are most likely to be best fitted for our purpose. Most persons must have noticed the differences in arrowroots prepared for eating. Sometimes upon cooling, the gelatinous mass will become more limpid, and eventually "go to water," as I have heard it expressed; while another sample will get stronger and stronger, as it becomes cold. It is also necessary that it is free from dirt and all impurities. The St. Vincent is the finest and cleanest that we get: and it has also another desirable qualification—its cheapness, compared with Bermuda and some other kinds. Great care and tact is required in using it for photo-sizing paper; and although I daresay many are fully acquainted with all the details and manipulations, yet to try and save others, who are not so, from meeting with some of the failures that I have experienced in time past, I will, as briefly as is compatible with clearness, explain the way in which I have proceeded to obtain the best results. Take 200 grains of suitable arrowroot, place it in a basin that will hold about a pint, and having crushed the lumps in it with a spoon, pour a few drops of cold water upon it, and well rub together. Have ready *boiling*, ten ounces of water and now pour a few drams upon the pasty mass in the basin, and after well mixing, add the remainder of the boiling water, quickly stirring all the while. It is a great assistance to get another person to pour the water upon the arrowroot, whilst the operator is stirring it. Should the contents of the basin be found to be transparent and perfectly smooth, it must be set aside till quite cold. If the arrowroot was of suitable quality, and the operation just described properly performed, it should be even thicker than when hot. Some recommend to boil the starch, but I do not think this necessary unless too much cold water were added to the dry arrowroot, which would prevent it becoming quite clear; should this be the case, a boil up will set all right. When cold the upper portion, which is much thicker than the remainder of the solution, is to be removed, care being taken that no portions of it remain, as they would inevitably form streaks on the finished pictures. I should not wonder if some were to smile at my thus minutely describing a simple process that every cook might be supposed to be thoroughly acquainted with; but the fact is, the arrowroot, or any other form of starch, mixed with no more care than is necessary for the table, is very unfit for photographic purposes.

We now take a sheet of photographic paper, lay it upon a board, and well sponge the surface with the prepared arrowroot, finish by drawing the sponge horizontally over the paper. Now proceed with another sheet placed by the side of the former, and treat it in the same way. Upon returning to the first we shall find the surface partially dry. The sponge is now to be passed over it to efface the streaks, taking care to finish in a perpendicular direction. The paper is then hung up to dry. By adopting this plan of having two sheets of paper on the board at once, all loss of time from waiting is avoided. It is at this part of the process that a practised hand can tell if the arrowroot was of the proper strength and properly mixed. Should it drag in a slimy manner over the surface, it was too strong, and must be thrown away and some fresh mixed, as it will be only a source of failure to attempt to thin the solution already prepared. When dry, the paper is to be rolled. Here again amateurs and those not accustomed to the rolling of paper, will require a few trials before they can accomplish it successfully. I will point out one or two proportions to be observed. The paper is to be laid face downwards, on the bed of the press, covered with a piece of fine cardboard, or a thin plate of metal, and then passed under the roller at a moderate pressure. If the paper then lie smothly, the maximum pressure may be applied, which will produce a most beautiful surface. If the covering of the cardboard be omitted, or if a great pressure be applied at first, the paper will be irrevocably spoiled by creases. Where practical, the operation of rolling is greatly facilitated by previously placing the paper under the pressure for twenty-four hours.

Having now described the mode adopted to prepare the paper, I must pass on to relate a few of my experiments. I have used fourteen or fifteen different samples of collodion, and I have come to the conclusion, that upon the collodion itself depends a great difference in the results not only as regards the surface, but also the entire character of the picture.

I received from Mr. Wharton Simpson a sample of pyroxyline that dissolved perfectly in three parts of alcohol and one of ether, to the amount of seven grains to the ounce. I found this too thick, and diluted it till it contained about five grains to the ounce. After it was sensitized, a piece of plain paper was coated with it. It possesed a very brilliant surface, and printed to a rich brown, inclining to purple, and toned rapidly and well I then diluted it with more alcohol, still keeping it saturated with the sensitive salts, and now it gives sandy-red prints, in the frame, which refuse to tone to anything except a ruby tint.

To sensitize the collodion, I added 50 grains of nitrate of uranium to each ounce, and when the collodion had taken up as much as it could, poured off the upper portion, and added five grains of nitrate of silver. Only about half of the silver was dissolved in the collodion. From the character of pictures produced, I was inclined to think that the nitrate of uranium

must contain a large proportion of free nitric acid. Finding this to be the fact, I mixed some more plain collodion and uranium, and introduced a few grains of carbonate of soda. After standing some time to settle, the upper portion was decanted, and the silver added. I then noticed that a shorter exposure was required, and that the prints were very much more brilliant. It did not seem probable that the great difference could be caused by the absence of free acid, so I made some experiments to try and ascertain the cause. I made an aqueous solution of the nitrate of uranium, and having placed several test tubes side by side, placed about two drachms in each. If a caustic alkali, such as potash or ammonia be added, the oxide will be precipitated; and it is by dissolving the oxide this is formed in different acids that I have obtained some of the rarer salts of uranium. But if a carbonate (I used that of soda) be poured into the solution instead of the caustic potash, a double decomposition appears to take place, carbonate of uranium and nitrate of soda being formed, no precipitation taking place. The oxide* precipitated by an alkali is soluble in this mixture of uranium and soda, as also in simple carbonate of soda; of course, in such a vehicle as collodion the decomposition takes place much more slowly, so that in a limited time only a trace of carbonate of uranium is probably formed, and it is to this salt that I am inclined to attribute the striking difference produced by the addition of an alkali to the collodion, and again, when the nitrate of silver is added, a minute *trace of carbonate of silver* may be formed, which would also conduce to give greater brilliancy to the prints. On mixing the collodion with the nitrate of uranium, I noticed that some of the samples become slightly opalescent, while others remained clear and transparent. After the addition of the silver, the opalescence increased in those samples that we clouded before, and some of those that had remained clear under the action of uranium became opalescent after the silver was added; only two out of the fifteen samples of collodion remained quite clear. No deposit is formed by the clouded sensitized collodion, the substance causing the semi-opacity being in a state of regular emulsion.

I believe it to arise from organic matter in the pyroxyline or solvents, and I have found the collodion containing it to work better than those that remained transparent. There is a very marked difference in the appearence of the prints when they leave the pressure frame, some samples of collodion causing the pictures to print of a beautiful green, others of a rich brown, and some of a yellow or orange tint, the last take the longest of all to tone, and it is very difficult to get it to assume the tint of a properly toned silver print. Those printing to a green or brown, tone very rapidly. In some of my experiments the half tones have coloured much more rapidly than the shadows; this for landscapes gives a very beautiful effect, the forcible foreground being of a rich brown or purple, while the distance melts into a tender grey.

In other cases, the shadows tone to a purple brown, leaving the middle tints of a roseate hue, which is often a very pleasing effect to obtain in portraits. Some friends would not for some time believe that the faces of some medallion heads I showed them had not been coloured, the flesh appearing by daylight of a pinkish tint.

To coat paper with collodion, I used a board with a handle underneath, very similar to the boards used by plasterers, and I also turn up the edges of the paper about the sixteenth of an inch; this enables the whole of the sheet to be coated without danger of spilling the collodion, or allowing it to run on the back of the paper. After printing, the pictures are placed in diluted acetic acid, one part in thirty of water, until the high lights are perfectly clean and white; this takes from ten to fifteen minutes. After well washing under a stream of water if possible they are placed in the toning and fixing bath. The necessity for some *fixing* agent, when silver has been used has been strongly and clearly pointed out in the photographic press, that I need not detain you by repeating the arguments used.

Suffice it to say that some fixing agent *must* be used where *silver* is employed. The bath I am best pleased with is formed by dissolving one and a half ounce of sulphocyanide of ammonium in twenty ounces of water, and adding from one to three grains of chloride of gold.

In using the sulphocyanide I have met with one or two very curious results, for which I cannot in any way account. I received from Mr. Simpson some of the sulphocyanide, and made a toning and fixing bath of one ounce of sulphocyanide, four of water and one grain of chloride of gold. As this worked well, with the exception of being rather too energetic in its action, I added six ounces of water.

After standing two days, I was much astonished to see that all the prints placed in it vanished entirely, leaving the paper perfectly white, and this was the case not only with argento-uranic prints, but the same effect ensued with silver prints on albumenized paper, and with chlorized collodion. From the original bulk of sulphocyanide I made several baths, yet all with the same result. The most curious part of the matter is to follow. After the refractory baths had stood unused for about a week, they all worked quite satisfactorily. I shall be glad to know if any others have met with any thing similar, as I can in no way account for the curious anomaly I experienced.

After removal from the toning bath, the prints are placed in a dish of water, for a few moments, and then well and rapidly washed. I am happy to say that I find *no overprinting at all requisite.* In my own later experiments the finished prints posses just as much half tone as when they leave the pressure frames, and even in some instances I have found details developed in the lights, that were invisible before submitting the prints to the action of the toning baths.

From my somewhat limited experience, I have deduced the following facts, to which I would beg to call your special attention. First, that no over-printing is required, except in very rare cases, and that the paper is generally even more sensitive than ordinary albumenized paper; the sensitiveness and brilliancy being in exact ratio, that is to say, the more sensitive the paper the softer the resulting image. Without doubt, *a Wothlytype can be printed in much less time than a silver picture.*

Secondly, that the *limits* of tone and brilliancy are very wide. I can affirm with confidence, that with no ordinary silver process can such a range, from delicacy and softness to extreme hardness, be produced from the same negative, as with the uranium.

The manufacturers of albumenized paper have chuckled over the supposed difficulty of coating paper with collodion, but it is quite an imaginary one, as, with a little practice, whole sheets of paper can be coated as easily and *more quickly* than albumenized paper can be sensitized. I think the greatest advantage of all will be, that when the proper conditions to produce a certain result have been ascertained, it can be produced again with certainty, so that when a ream of *suitable* paper has been sized, and a large quantity of collodion mixed, *in bulk*; prints precisely resembling each other will be yielded by the same negative; and as the fixing and toning bath is in one, any desired tone can be obtained.

This paper has grown to such a length that I must now perforce conclude it, though, I have a great deal more that I should like to say about some other experiments connected with uranium printing. It seems to me that the subject contains matter for many a future evening's discussion, so that perhaps it would be better if I again repeated my experiments before bringing them before you.

* Since writing the above I find that I was in error in supposing the yellow precipitate I obtained to be the oxide of uranium. The following is the rationale of the changes that occur:—When caustic alkali is added to a solution of nitrate of sesquioxide of uranium ($U_2 O_3$, $NO_5 + 6$ HO) a yellow precipitate of hydrated oxide falls, which retains, however, a portion of the precipitant. But when ammonia is added to a solution of nitrate of *per*oxide of uranium ($U_2 O_5$) O_2, $NO_5 + 6$ HO, the salt used for the Wothlytype, and known as nitrate of uranium, a uranate of ammonia is thrown down, and if this precipitate is washed and heated to redness to drive off the ammonia, the peroxide will remain.

DIAMOND CAMEO PORTRAITS.

BY F. R. WINDOW.

The introduction some few years ago of the carte de visite style of portraiture marked an epoch in photographic history. Indeed this is true, in whatever sense we understand it, whether artistically, mechanically, or commercially. From the carte de visite we may date the first general appreciation by photographers of the action and harmony of parts necessary to the creation of a picture worthy of the name. Its minuteness and delicacy rendered necessary greater operative skill than was previously

general, and a greater command over the various agents used in the production: while its universal popularity gave such an impulse to the art commercially, that from being in the hands of a few, it has become the profession of thousands, and one which, practised with intelligence, can be made to yield profit to all.

The carte de visite has become an institution of all countries, and in some form or other will probably long continue to jog our memory of absent friends, and make us familiar with countenances which we could otherwise have no means of seeing or imagining.

Notwithstanding its wide spread and well deserved popularity, the full length carte de visite is not without its defects; defects, indeed, which are mainly due to its ambitious form, and the great difficulty, with the present means at our disposal, of fulfilling all the requirements necessary to produce the desired effect in its totality, and in perfection. Of course, the higher the aim, the more severe will be the test by which success will be measured.

In a portrait giving the head only, or the head and bust, all that can be required is that the pose be natural and the likeness good. These a photographer who knows his business may generally reckon on securing with most sitters. But the carte de visite claims a higher standard of excellence, and has other requirements; some of them even scarcely within the control of the artist. The carte de visite represents in full length, a person engaged in his daily pursuits; and whatever is incongruous and unsuitable in such a picture leaves a gap for criticism.

The pose of every limb, must be one that is natural to the sitter; not necessarily elegant or graceful, as this would often be foreign to the individual. The expression of the face must be easy; and it is needless to say how difficult this is to obtain at all times, while the sitter is thinking of his hands, or his general bearing. Finally, the occupation and surroundings must be suitable to the social standing, tastes, and acquirements of the sitter; and must all be in good keeping with each other.

If an artist paint such a picture he has many sittings, often renewed, and extending over weeks at least. He has thus opportunity, to learn the salient characteristics of his sitter, and to mark his individuality. To produce the same result by other means, the photographer is generally granted one audience of a few minutes only; and yet he works at this disadvantage, that while the artist can draw from his model, not as it is, but as he wishes it to be, the photographer must represent the living figure as he is able to pose it, *in propriâ personâ*. As a large proportion of persons come to him with a fixed idea of a pose in which they fancy they would like to be taken, and as their ideal is often the reverse of either ease or individuality, his task in this respect is not an easy one. Add to this the necessity of keeping the whole body immoveable in a certain attitude, and the countenance with an unchanged expression during the taking of the picture, and the reason why many excellent photographs are unsatisfactory portraits is easily understood.

It was the consciousness of these drawbacks attending the production of perfect full length cartes de visite, that promoted the invention of the diamond cameo style of portraiture. The authors endeavoured to eliminate in as great a degree as possible, the disadvantages under which the photographer worked, and to heighten and increase the effect by such legitimate means as would best serve to attain the end they sought.

The successful practice of that beautiful invention, photosculpture in Paris, first suggested the idea of arranging on one card, several views of the same head; thus affording the means of embracing at one view, as many varied aspects of the countenance, and as four positions are sufficient to render every characteristic evident, this was the number selected: arranged in a lozenge or *diamond* shape upon the card:—whence the name.

It was further decided to adopt the classic form of an oval cameo for each picture, and to render the effect of relief nearly similar, by embossing them with a die.

The specimens on the table will enable the meeting to decide how far the authors are justified by the result.

It is believed that the portraits, as a rule, are the most life-like and characteristic of any yet produced by photographic means. The manipulations being easy, and the centre or best part of the lens being chiefly employed, the photography is always good. As the head only has to be covered, the full aperture of the lens can be used; therefore, the exposure is very short. This combined with all absence of restraint to the sitter in posing the body, generally secures that calm and perfectly natural expression of the features, which alone can make a pleasing likeness.

There is no difficulty in producing the diamond cameos; and as there are neither expensive backgrounds or any accessories required, the cost is less than with cartes de visite.

An ordinary carte de visite lens is used. Those numbered 2 B, are the best.

It is found for practical reasons better to move the plate, for the various positions, than the lens, as by doing so, all parallax is avoided. The plate is shifted by means of a repeating back, (which can be fitted on to most cameras) employing the original focussing screen and dark slide belonging to the camera. By means of this repeating back, the plate can be placed in any of the three positions, both vertically and horizontally. Thus the plate must be held at the top of its vertical movement for the top picture, at its lowest for the bottom picture, and in the middle for the two side ones. Also it must be, horizontally, in the middle of its course for the top and bottom pictures, and at its extreme right and left for the two side ones.

In the fixed plate of the back upon which the moveable parts work is adapted a tube placed in the axis of the lens, terminating as close to the dark slide as possible, in an oval aperture of the size required to permit just so much of the image to pass through as is wanted, and shut off all the rest. This obviates the necessity of having partitions inside the camera. By means of this contrivance, in whatever position the plate may be, a small oval image is thrown on that part which is opposite to the lens, and all the remainder of the plate is in perfect darkness; so that if the plate be exposed four times in the proper positions, four oval images are impressed upon it, and the remaining portions of it will be clear glass.*

To take the pictures the model must be seated, so that he can conveniently turn the head in all directions without restraint, and a rest placed against the head. Having done this, the operator arranges the camera so that the image falls properly centred within the oval, and focusses it with care. It will be seen that if the head be kept always for each change of position against, and well in the curve of the head rest, both the focus and centring will remain unaltered. The dark slide with the plate can therefore be placed in the camera, and the shutter lifted, before the first pose of the head is definitively settled upon; and directly this is settled the exposure may commence. In this manner the sitter suffers so little restraint that usually a good expression may be secured. The remaining three pictures are successively taken, without there being any necessity for removing the plate to re-adjust the focus.

It will be found best in practice to adopt a regular routine in respect to the order in which the pictures are taken, varying, of course, the pose; such as first the top, second the bottom, third the left, and the last the right; and to make it a rule to adhere to it, otherwise the operator may get confused, and, forgetting where he has taken the previous pictures, may get two portraits superposed, and a blank space where one of them should be. But if he have a fixed rule, and knows, for example, that he has taken three pictures, he will be certain which positions they occupy upon the plate, and also the proper position for the fourth, which he is about to take.

The negative thus produced, then, consists of four oval pictures on a clear glass ground; and if printed direct, the cameos would show upon a black ground. In order to print them upon a white ground, a mask of opaque paper, with the ovals cut out, is placed over the negative, which shields all the ground from the action of the light; leaving every part, excepting the four pictures, a pure white.

It is essential for the final beauty of the cameo, that these masks be cut with great neatness and precision: that the ovals be well formed, without elbows: and that the edges be even and not jagged. The ovals must be of the exact size and shape of the steel die, so that the latter, when used, may leave no margin either within or without the picture.

These masks are cut by means of a steel template, having the exact oval filed out in it, and with two straight lines drawn at right angles on it from edge to edge, passing through the major and minor axes of the ovals.

It is used as follows. On a piece of perfectly opaque paper

* Diagrams fully illustrating the various manipulations will be given in our next.

draw three vertical straight lines 0·5 of an inch apart: and perpendicular to these three horizontal lines 0·95 of an inch apart. These lines, and their intersections give the several diameters and centres of all the ovals, in their exact positions. The paper is now laid on a piece of glass, and the steel template placed upon it, so that its cross lines correspond with those of one of the ovals; when, being held firmly in contact, a sharp knife is passed round the edge with one sweep, and the piece cut out: and soon with the others. The operation has no difficulty.

A house of business supplies these masks at a very cheap rate, cut out by machinery. But photographers will do well to have the means, at least, of making them for themselves in case of emergency.

The mask can of course, be fixed permanently on the negative, or they can be attached lightly by a piece of gummed paper at the corners, and be removed to serve on other negatives.

The finished prints are mounted in the usual manner, and slightly rolled, when they are ready for stamping.

This operation is performed with a screw press and concave die.

The form of the press is of little consequence, and will mostly be decided by the amount of business the photographer requires it to do in a given time.

Each of the four ovals is brought separately under the die, and stamped, the operator registering the position by the eye. A very little practice is required to render this operation very sure and expeditious. In the author's establishment the stamping is done by a girl at the rate of about a gross of cards in the hour. No ordinary method of guides for registering can be employed, as this would suppose every print to be cut and mounted absolutely to a hair's breadth alike; which in practice is impossible.

This process of stamping completes the picture. It will be seen that this last is the only addition in point of labour to the several operations of ordinary cartes de visite; and that, consequently, the trouble is only augmented to that amount.

The exact dimensions of all the parts have not been decided by chance, but after numerous experiments with various sizes. It is believed that the selected oval is the best for the purpose for which it is intended. It is sufficiently large to contain a picture really useful and valuable as a portrait; and it gains an effect of solidity from the embossing which would in a great measure be lost on a larger surface, unless the die were proportionately deeper cut; and this, experience shows, causes the card to buckle.

As this style of portraiture bids fair to become general—if the rapidity with which the profession are taking it up, and the expressed approval of the public can be accepted as a criterion,—and in the belief that it will be useful to have all the parts and dimensions of apparatus for this process similar, the several measurements are given below:—

Longest diameter of ovals	1 inch.
Shortest ,, ,, ...	¾ ,,
Centre to centre of the top and bottom ovals (*i. e.*, total vertical movement of the repeating back)	1 9-10ths
Centre to centre of the side ovals, (*i. e.*, total horizontal movement of the repeating back)	1 inch.

For transport by post or otherwise, the diamond cameos pack well together between two cardboards, if a thick perforated card, having the ovals punched out of it, be first laid on the top picture to prevent friction. It is well to bind this perforated card to the others with a strip of paper—as packets of envelopes are packed—to avoid slipping. And this slip may usefully carry a printed advice to customers to adopt the same precautions when sending copies to their friends by post, otherwise they are liable to injury from opposition stamping by the Post Office authorities.

It is not for the author to advance any opinion upon the merits of this invention, but he may legitimately state that the large portion of the public forming the immediate connection of his firm have endorsed it with approval in a manner which has far surpassed the most sanguine expectations.

APPARATUS FOR SEPARATING SILVER AND GOLD FROM HYPOSULPHITE SOLUTIONS,

Without the Offensive and Detrimental Compounds of Sulphur being Diffused into the Atelier.

BY F. W. HART.*

The short communication which I have the honour of submitting to your notice this evening is a description of the model now before you. I made it some twelve months since for the purpose of separating the silver and gold from my hyposulphite, fixing, and other solutions not precipitated by chloride of sodium (I would here remark that hydrochloric acid is much to be preferred in the place of common salt, as generally used for the precipitation of chloride of silver in washing waters previous to toning and fixing, seven cubic centimetres being sufficient for each sheet of paper as usually sensitized); during that time it has worked with great satisfaction, and I now bring it before you, thinking it would be interesting and profitable to the members, and the photographic public at large. In the first place, we have the tray on which solutions are poured, and run into the precipitating compartment. On removing the outside case, we have two chambers disclosed, and a filtering apparatus, I have adapted to the nature of the precipitates formed. In the smaller compartment we arrange a voltaic pair of plates in such a manner that the *cathode* shall be on the partition, separating the larger from the smaller chamber, which we charge with a solution, one part by weight of sulphuric acid to fifteen of water. On the other side of the partition, and in the precipitating chamber, an *anode of zinc* is placed, and opposite, in the solution to be electrolyzed, its corresponding *cathode*. The two pairs are then connected, and the electrolysis commences. It is important that the *anode* in the precipitating chamber be of *zinc* for this reason, that on testing the solution run off from the filter—with sulphide of sodium—after a few hours' action any zinc in solution would not mislead, as it is the only metal which has a white sulphide, and the non-appearance of a black or brownish-black precipitate indicates the silver being all thrown down. The filter is then set in action by removing the compressed clip, and the useless solution run off.

The average time for the complete process is about 24 hours. When the accumulation of precipitates begin to impede the action of the filter, they can be washed out into an ordinary funnel filter to drain and dry for the reducing to metallic state. The sulphide of zinc formed and mixed with the sulphide of silver can be removed by hydrochloric acid, but I think it would be better left to the reducer to separate.

ON FUMING WITH AMMONIA.

BY A. G. GRANT.†

Prepare a solution of pure nitrate of silver, not less than sixty grains to the ounce. Common water is best, as it generally contains a small quantity of sodium, which assists in preventing the solution from discolouring. Pour the solution into a tray, and float the paper upon it for two minutes for *slightly* albumenized paper, and three to four for *very highly* albumenized paper. Should the paper remain in contact with the silver solution five minutes, it will do it no harm. Breathe upon the paper if it be inclined to curl up at the edges, when it will go down to a flat position. When it is ready to come off, lift the corner with a strip of glass, and hang up in a dark place to drain and dry. Papers are very conveniently hung on a line with either spring glass or American clips.

Very many modifications of the silver solution for albumen paper have been prescribed—among others, the

* Read at a meeting of the Photographic Society Dec. 6th.

† Read at a meeting of the South London Photographic Society, on Thursday, Dec. 8.

admixture of nitrate of ammonia; or, what is equivalent, dissolving the precipitate formed by aqua ammonia with nitric acid. Ammoniacal salts of silver give a rich purple colour to photographic prints, and hence it is highly desirable to secure the advantage of ammonia in the silver sensitizing of albumen paper. Instead of introducing nitrate of ammonia into the silver solution, it is better to form an ammonia-nitrate of silver on the surface of the paper by the fuming process, which will presently be described. Nitrate of ammonia in the solution will not economise silver, as has been claimed, by making a less degree of strength answer for prints of equal richness and beauty. Neither is there any advantage in employing it in conjunction with fuming. A silver solution for albumen paper will sometimes become discoloured. The best method of decolourising is to filter it through animal charcoal.

Fuming Process with Ammonia.

When the silvered albumen paper is perfectly dry, place it in the fuming box, and expose to the fumes of strong ammonia contained in a glass dish in the bottom of the box, made air-tight by means of a plate-glass sliding cover, which can be opened and closed at pleasure from the outside of the fuming box, when it is filled with dry sensitized paper, ready to receive the fumes of ammonia.

The length of time necessary for fuming varies with different kinds of paper, from ten minutes to half an hour. A paper heavily glazed with albumen requires a longer exposure to the fumes than thin albumenized paper. A bad article of paper will sometimes turn brown over the ammonia vapour, and is therefore worthless for this process. In placing the paper in the fuming box, it must be fastened with the back of the paper to the lid, thus the albumen surface is exposed to the ammonia fumes.

The paper must never be put in the fuming box damp, for in that case a scum will form on the surface, which will spoil it for printing. The same effect takes place when the albumenized paper is excessively fumed. The paper should be exposed long enough in the fuming box to cause the prints to appear of a rich purple colour while printing. If the paper appears red or chocolate-brown in the printing-frame, it has not remained long enough in the fuming box.

On removing the paper from the fuming box, it should be aired a few minutes, to allow the free ammonia to evaporate before placing it in the printing-frame.

The advantages of ammonia are: that a weaker solution solution may be used to produce equally good results from the same quality of negatives, and in two-thirds the time; they are more easily toned, and with less gold; they are less liable to become mealy during the toning: that greater sensitiveness is obtained, so that weaker negatives, with better detail, can be employed, and the prints produced appear more luminous and brilliant.

In hot weather the ammonia will be found to evaporate a drachm in about fifteen minutes. In very cold weather the bottom of the box should be warmed, so that the temperature in the box may be kept up to 60 or 65 degrees while the paper is fuming.

My improved box is eight inches wide, two feet long, and two feet high, and will fume paper for 144 cards at once, with a swing handle at each end, a knob on each lid, with lock and key: it is light, neat, and strongly made of thoroughly seasoned wood, and polished.

Printing the Fumed Paper.

A negative which is over-exposed will produce the best results printed in diffused light. A negative under-exposed and over-developed or intensified produces the best results printed in the blazing sun-light. As a rule, it may be concluded that this operation is complete when either the lights have become slightly tinged by reduction, or when bronzing begins to appear in the shadows. Now remove the print from the frame, taking care not to expose it to strong light, or the whites will be injured. Wash the prints thoroughly, so as to remove all free ammonia nitrate of silver, which requires about fifteen minutes, and at least three changes of water.

The washed prints may now be toned by any common formula. But to those who may desire it, I will give a few formulæ for toning, which I know to work well.

Formula No. 1.

Chloride of gold (pure)	1 grain.
Distilled water	8 ounces.
Carbonate of soda to neutralise the acidity.	
Alcohol (pure)	2 drachms.

Formula No. 2.

Chloride of gold (common) ...	2 grains.
Distilled water	8 ounces.
Phosphate, citrate, or acetate of soda	100 grains.
Chalk to neutralize the acidity.	

Formula No. 3.

Chloride of gold (pure)	2 grains.
Distilled water	4 ounces.
Chalk to neutralise the acidity.	
Phosphate of soda	2 grains.
Acetate of soda	2 grains.
Nitrate of uranium	2 grains.
Distilled water	4 ounces.
Chalk to neutralise the acidity.	

Filter the latter and mix.

To neutralise acid solution, throw in a leaf of blue litmus paper, which turns red; then add chalk or carbonate of soda (I prefer the former) until the blue colour is restored.

Fixing Solution.

Hyposulphite of soda	2 ounces.
Water	12 ounces.
Alcohol	4 drachms.

The first effect of this bath is to turn the prints a red hue, and then finally back again. Move the prints about in this bath constantly, and keep them in until the whites are perfectly clear when viewed by transmitted light, and the tone has been restored. Now take one by one as fast as the fixing is completed, and remove them to the washing apparatus: an hour in running water will remove all traces of hypo. They are then ready for drying in usual manner.

HOW TO RESTORE YELLOW PRINTS.

BY G. W. BROWN.

Some days ago I found myself with some seven dozen photographs just ready to mount; and as I sat down to do so, to my great surprise, *all* of them had turned to a bright yellow. The pictures were pronounced "ruined," and my printer was set at work to fill the several orders again, and was instructed to use extra care in all the manipulations, washings, &c., to avoid another lot of the same sort. We have not yet ascertained where the fault lay, but presume it was through negligent washing between the toning and fixing bath.

A few days ago, after much reflection, I thought I would experiment, and see if I could not tone the yellow pictures, not that they would be of any particular use now, but against being placed in a similar dilemma.

I commenced with soaking a part of them in a saturated solution of oxalic acid. The colour remained unchanged.

To-day, I soaked the balance in a saturated solution of bichloride of mercury. The yellow disappeared almost instantly. After washing them, I put them between sheets of blotting paper to dry, as is my custom; but on examining them soon after, I observed they had again assumed their yellowish hue, but not as brilliant as at first. I concluded the defect was owing to defective soaking, so I again immersed them in a warm solution of bichloride of mercury, where I allowed them to remain an

hour or more, after which they were again washed through several changes of water, and were dried by the usual process, when they appear as clear as any pictures I have put up, and the tone not injured in the least.—*American Journal of Photography.*

Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting was held on the evening of Thursday, December 8th, the Rev. F. F. Statham, M.A., F.G.S., &c., in the chair.

The minutes of a previous meeting were read and confirmed, after which Mr. Charles Pearce, Mr. A. F. Bedford, and Mr. H. Hemmings were elected members of the society.

The attention of members was called to the forthcoming International Exhibition to be held at Dublin, opening in May, 1865, members being urged to avail themselves of the opportunity of contributing to the first exhibition of the kind in which photography was admitted in the classification as a fine art. Forms of application for space were placed at the service of members. After a conversational discussion, it was resolved that such members of the society as were desirous of contributing to a general series of pictures exhibited by members of the South London Photographic Society should signify that wish at the next meeting, to be held on the second Thursday in January.

The Chairman called attention to the December number of the *Art Student*, presented to the society by Mr. Wall.

Mr. Grant then read a paper on the use of Ammonia Fuming in Printing. (See p. 608.)

Mr. Harman asked why Mr. Grant added alcohol to the fixing bath.

Mr. Grant thought the prints fixed better and quicker, preserving their whites better.

Mr. Cooper then resumed the adjourned debate on uranium printing, and exhibited a number of very successful prints, which were much admired. He detailed a number of experiments in which he had obtained every class of picture, varying from very soft to extremely hard, and also having great variety of tone. The greater part of the experiences described we need not recapitulate here, as they will be found in his paper read before the London Photographic Society, and published on another page. Since reading that paper, he had made some experiments in the production of a suitable gun-cotton for making the collodion. He had found 12 oz. by measure of nitric acid, sp. gr. 1390; 36 oz. of sulphuric acid, sp. gr. 1845; 8 oz. of water, and 2 oz. of cotton, immersed at a temperature of 120° Fahr., and left 15 minutes, give excellent results, the pyroxyline dissolving perfectly to the extent of 7½ grains to the ounce, using 3 parts of alcohol and 1 of ether. The collodion gave a glassy film, and was altogether suitable. All his experiments tended to show that the quality of the result depended mainly on the collodion.

The Chairman said that in many of its features the behaviour of uranium reminded him of that of manganese. Was Mr. Cooper aware whether the samples of nitrate of uranium with which he had been working were pure or not.

Mr. Cooper said he had used three or four samples, slightly different in appearance. Some of them were very acid, but of their purity he was uncertain.

Mr. Sebastian Davis described some singular results he had obtained. He had used *Saxe* paper sized with starch. This, when coated with the prepared collodion, printed of an orange colour; but when placed in water to rinse previous to toning, it grew paler, and finally disappeared.

Mr. Cooper said, in his early experiments, one or two of the prints disappeared, and he was still unable to account for the circumstance. It singularly happened that this was in a toning and fixing bath of sulphocyanide of ammonium and gold, and at the same time, ordinary silver prints also disappeared. What was stranger still, the same bath, after standing a week, worked all right, without injuring the prints. He found that the use of the acid bath prevented the prints losing in the toning and fixing. He found that if the prints were placed at once in the fixing and toning bath, they were apt to disappear. He found with his present mode of working that no over-printing was necessary.

Mr. Davis said that he had not heard any explanation given of the part intended to be effected by the acid bath.

Mr. Cooper could only say he had found that it was necessary in practice.

Mr. Davis said it was desirable to know in what way it acted, and if it were a merely empirical suggestion.

Mr. Blanchard had found the uranium printing much slower than silver printing; it required at least four times as long exposure.

Mr. Cooper found it more sensitive than ordinary silver printing, and that the quicker it printed, the softer and more delicate the image, and the slower the more vigorous. He could obtain a larger number of uranium prints in a day, from any given negative, than he could by ordinary silver printing. One of his negatives, which was very dense, and from which he could only obtain one ordinary silver print in a day, he had lent for a short time to the Association, and they produced three prints, in the time he could have produced one on albumenized paper.

After some further conversation on the discrepances in experience,

Mr. Blanchard said, probably the difference between the various samples of nitrate of uranium might account for part. One sample he had, was transpareut, greenish, and very deliquescent, another opaque and yellow, more like sulphur.

Mr. Cooper said he had noticed different qualities, but all were deliquescent.

Mr. Davis had noticed that the samples of collodion which kept most on the surface were most sensitive.

Mr. Cooper said that the difference in the quantity of cotton present in the collodion, materially influenced results, and caused a great difference in the tone.

Mr. Howard said many of the experiences referred to, were similar to those recorded a few years ago, which had been, he thought, too much overlooked.

Mr. Wharton Simpson, said he had made many experiments, with varying results. It was, however, scarcely matter for surprise, when it was remembered how many circumstances would influence the result, and how little was understood at present about any of them. The character of the pyroxyline, the quantity dissolved, and the proportion of the solvents; the purity of the nitrate of uranium, and the proportion employed, and also the proportions of nitrate of silver; the quality of the paper, and the nature of the sizing material. These, and various other conditions would materially influence the results, and each would require a carefully conducted series of experiments in order to determine the best formula. He had not found any difference whether he used the acid bath or not. Without entering into detail he might remark that he had found it possible with the same negative to get a much wider range of results from soft to hard, than he could with ordinary silver printing, as the specimens he handed round would illustrate. He had found, as Mr. Cooper had, that sometimes prints appeared to become more full of detail in the toning bath, and this he attributed to the gold acting as a developer to some extent, as it did in uranium printing without silver.

Mr. Cooper accounted for it, by the detail being present but not apparent in yellow light, on account of the yellow colour of the paper.

After some further conversation on the subject, on the motion of Mr. Simpson, the discussion was adjourned.

The Secretary then read a paper by Mr. Window, on the Diamond Cameo Portraits (see p. 606).

Mr. Wall made some remarks defending card pictures from any injurious comparison with the Diamond Cameos. The fact that the former required more artistic skill was no argument in favour of the latter. He saw no reason why taking a bust should secure a better expression. He did not like the convexity, and thought that the appearance of relief was rather due to the good photography, than to the convex form. He drew on the black board a section of a convex surface, which he liked better. Moreover, taking four heads in different positions on one plate, rendered necessary the use of one arrangement of light, whereas it was well known that every change in position rendered a fresh arrangement of light necessary.

Mr. Simpson said that Mr. Wall was in error in supposing the necessity of taking the four heads without altering the light. In practice, Mr. Window rearranged the light, wherever he found the position and character of the head required it; this was simply and rapidly done, by closing one blind and opening another. A good expression was more easily obtained in a

bust, than in a full length figure, because, in the former, there was no arrangement of hands, and legs, &c., to make the sitter nervous and fidgetty. He was sorry Mr. Window had not sent a few of the pictures before they were made convex, in order that Mr. Wall might have convinced himself of his error in supposing that no increase of relief was obtained by the convexity.

The Chairman said that there was no necessary antagonism between card pictures and the diamond cameos: both, when well executed, were very beautiful, and persons who had had the cards would now probably have the cameos.

Mr. Bishop, of the firm of Marion and Co., exhibited a number of very fine specimens, and also frames, albums, &c., to contain them. Also a camera by Mr. Dallmeyer, arranged on Mr. Window's principle for taking the four heads in succession, and an arming press and punch, for producing the convexity.

Mr. Collis, of the firm of Ottewill, Collis & Co., exhibited a camera, with a modified arrangement for taking the four heads.

After some further conversation on the subject, in which the Chairman, Mr. Bishop, Mr. Wall, Mr. Cooper, Mr. Howard and others took part, the subject dropped.

It was announced that Mr. Hart would exhibit and describe his apparatus for obtaining silver from the old hypo solutions at the next meeting.

After some votes of thanks, the proceedings terminated.

Correspondence.

THE WOTHLYTYPE PROCESS.

Sir,—Will you permit me, through the medium of your columns, to suggest to the Directors of the United Association of Photography, that it would be much more satisfactory to photographers in general, and also much more to the interests of the Association's shareholders, if their agents were to supply small specimen bottles of the chemicals to be used, ready mixed, and the description of paper which is recommended, for the Wothlytype process. This plan would enable every photographer to judge for himself as to the capabilities of the process, and would relieve them of that hesitation which at present exists about purchasing "a pig in a poke."—I am, sir, yours truly,

One who Waits (in vain) for a
December 11, 1864. Wothlytype Specimen.

PORTRAITS WITH THE MAGNESIUM LIGHT.

Sir,—As I have never said that a foot of magnesium wire weighs 20 grains, I am unable to answer Mr. Grant's two first questions. If he will read my letter again, he cannot fail to understand what I wrote. Should he still be unable to comprehend my meaning, as to a strand or taper of the wires being made to weigh 20 grains, if he will call on Messrs. Johnson and Matthie, I have no doubt they will show him experimentally how the thing is done.

With the manufacture of the burner described, I have nothing whatever to do, but I believe the explanation of the word "patent," on the label is, that the makers had no other in stock, and all the first supply were so labelled merely to name the article. Mr. Grant can satisfy himself that the lamp is not patented by enquiring at the Patent Office.—Yours, obediently, A. Brothers.

Manchester, 12*th Dec.*, 1864.

Talk in the Studio.

Solar Camera Printing by Lime Light.—The large solar camera print, 4 feet 6 inches by 3 feet 6 inches, exhibited at the last meeting of the Photographic Society by Mr. Aldis, was, he informs us, printed by the aid of the lime light and development, the time of exposure being about six minutes. The picture consisted of a group of three figures, all of which were excellent in definition, modelling and tone. Mr. Aldis is endeavouring to bring photography in this style under the especial recognition of portrait painters.

Singular Charge of Robbing a Photographer.—Edward Korner, a young man, described as an engineer, and who gave an address in Bridge Court, Westminster, was charged before Mr. Tyrwhitt, at Marlborough Street, on Tuesday, with stealing a lens of the value of £4, the property of Mr. Morris Rouse, photographer, of No. 376, Oxford Street.—Mr. Morris Rouse said—On Sunday, the 17th July last, about one o'clock, the prisoner came into my place to have his likeness taken. There were several other persons present waiting to have their portraits taken. The prisoner said he was in no hurry, and he gave his turn up to every one, and waited to the last. I took the prisoner's likeness, and he then said he would have some *cartes de visite* as well. I went into the dark room with the likeness, and when I came out with it the prisoner had "hooked" it with a lens from the camera. I ran down stairs with the likeness in my hand, and saw the prisoner running, I cried "Stop thief," but it was of no use. I then took copies of the likeness, and sent them to the different stations. I heard no more of the matter till yesterday, when, about the same time as on the previous occasion, in walked the prisoner into my room. As soon as he saw me he tried to "hook" it, but I called my door man, and he prevented him doing so. I then went for a constable, and gave the prisoner into custody. Mr. Tyrwhitt.—What did the prisoner say? Mr. Rouse.—I do not remember. I was very nervous. On asking him if he remembered the likeness he said he did not remember me. I am positive the prisoner is the same man, and I have his portrait. The portrait was handed to the magistrate. It was a very good likeness of the prisoner. The Prisoner—I have several times had my likeness taken at the same place, and the portrait produced may be a spoilt one the prosecutor had by him. I know nothing about the lens, I can assure you. Mr. Tyrwhitt—I shall remand the prisoner for a week, and I will take his own bail. Mr. Rouse.—I have witnesses here who will say the prisoner only had his likeness once taken.

Photography in the Pyramids.—*The Telegraph*, speaking of Professor Piazzi Smyth's projected photographic experiments in the Pyramids, which are to be illuminated with the magnesium light, says Professor Piazzi Smyth has a theory, which he has urged with much ability, that the great Pyramid at least is no tomb; that the sarcophagus of porphyry in its heart is no sarcophagus; and that all this time we have misunderstood, or rather entirely missed, special and sublime facts, which the mountain of "the Hyksos" was meant to teach us. He holds that in this towering structure the mathematical and astronomical science of old Egypt is enshrined. He has shown that the measurements of the great Pyramid, by certain deductions, give actually and accurately its geographical position, besides eternally marking the cardinal points at the period of erection. Thus, standing where it does, and being of the dimensions it has, the pyramid can only be the translation into granite and limestone of its own site. Furthermore, our Scotch astronomer maintains that the porphyry vessel or receptacle in the interior was meant to be an indestructable standard of length and capacity, built of a material which heat and cold do not affect, and enshrined in the heart of millions of tons of hewn rock to avoid chance or change. Some agree with the astronomer; some think that, living "above the clouds at Teneriffe," he has paid too long a visit to "Nephelokokkugia," and has merely invented an ingenious theory. However, Professor Piazzi Smyth is now arming himself for an invasion of the innermost secrets of the great pyramid. He has a firman from the Pasha, and a photographic apparatus, and magnesium-wire to burn in "the King's Chamber," so that he brings us back pictures of "an interior" which has been sealed from the eyes of the world for at least three thousand years, and which now, since it was opened by Haroun Alraschid's successor, is almost as much a mystery. Was it a wild fancy to imagine the granite gods and goddesses of Misraim walking down Oxford Street, or writing explanations of themselves to a London editor? Not much more, at any rate, than that which is upon the point of fulfilment—a scientific "savage" of Britain burning a metal that Egypt never heard

of, to take, by a process that Moses with "all the wisdom of the Egyptians" never dreamed of, a picture of a secret of secrets, which, hundreds of generations old, still defies the latest, like the calm and wonderful visage of the sphinx couched outside, and staring with an untold meaning over the sails of the unchanging Nile.

To Correspondents.

An Amateur, Forfarshire.—There is no work especially on photography in India. In the first part of "Practical Photography," published by Negretti and Zambra, there is a chapter on photography in tropical climates, and we believe there is something on the subject in a pamphlet published by Mr. How. There have been several articles on the subject written by photographers in India recently published in our pages.

P. L.—The exact distance of which the front and back lens of a combination must be placed apart is a question for a practical optician, and will depend much upon its form, focus, &c. It is impossible to state from your general description.

Vanni.—We could scarcely enumerate in this column all the causes which might induce a fogging tendency in a bath. The chief causes are alkalinity of the bath or the presence of organic matter. The remedy for the first is acid; for the second, sunning or boiling down. The decomposition of cyanide will cause the evolution of fumes of hydrocyanic acid, which might possibly cause fogging. An old bath with a large accumulation of ether, alcohol, &c., derived from the collodion, is very apt to get out of order again, even after rectification. The best plan is to boil it down.

Old Friend.—A good half-plate portrait lens answers very well for enlarging in the solar camera. A No. 1 triple is better still. 2. We cannot state average exposure, as so much depends on intensity of negative, strength of light, and mode in which the paper is prepared. 3. You will find details on p. 283, June 10th, of the present volume of the News. 4. It is probable that the trouble would be greater than profit, as the bulk of the solutions have probably gone to the drain.

John Buckley.—It is quite possible to make an accurate *facsimile* of a bank note by means of photography, but any one familiar with the peculiar characteristics of a photographic image, and of the image obtained at the printing press, would readily detect the difference. Or if the eye could not detect the difference, chemical tests could very readily. Holding up the note and examining the water-mark by transmitted light would also readily enable any one to detect the difference.

A. R.—We prefer about fourteen feet at the ridge and nine feet at the eaves. The best proportion of glass, &c., you will find in an article in our last Year-Book.

A. S. Watson.—We have forwarded the letter.

Islinotonian.—For the size you require either portrait or view lens will serve. You cannot do better than adopt the method described by Mr. Blanchard, in an article on "Transparencies," in our last Year-Book.

Sea Side.—The bath may be filtered and strengthened from time to time by adding more of a fresh strong solution to it.

W. H. Y.—The process you have adopted is not the best, especially for securing cleanliness. The addition of a grain or two each of chloride of ammonium and bromide of potassium would aid you in this respect. The paper should not be immersed in the silver solution, but brushed with or floated on it. You will find much more information on the subject than we can give you in this column in our last Year-Book, which contains an article on solar camera printing, by Mr. Sydney Smyth, and our forthcoming Year-Book, which contains an article on the subject, by Mr. Walter Woodbury; both these gentlemen having been very successful in this branch of photography. We shall be glad to hear again from you of your success, and also to see the specimen you mention.

W. B., Photo Lithographer.—You do not state the nature of the information you require in regard to photo-lithography. We shall have pleasure in giving you the best information we can on any definite point, but it is somewhat difficult to give a "little information on photo-lithography" without knowing the points on which you require information, or to what extent you are already informed on the subject.

A. K. Walker—We have not had opportunity yet for carefully testing your bath. Press of engagements and bad weather combining to cause delay. In the only experiment we had time to make we got a moderately-good picture with it and the collodion, but not quite free from markings, the cause of which we have not yet had time to ascertain.

Ram Chundra Rao Bulvent.—If your film on tannin plates becomes loose and slips off, despite the varnishing of the edges, you may either use a less horny collodion, or give the plates a preliminary coating of either gelatine or india-rubber, probably the latter will be best. 2. Pinholes must be avoided by using the precautions we have recently described for the wet process. 3. The markings you describe arise from several causes, and may proceed either from the collodion or the manipulation, immersing the plate before it is properly set is one cause; the use of a dark slide with accumulation of silver solution is a fertile cause. 4. In taking portraits in the open air, it is important to have a means of screening the head from direct top light, in the the shape of a canopy extending four or five feet. The kind of back ground is a matter of taste, a plain grey cloth answers well

Amateur.—So far as we know at present, the collodion prepared with uranium and silver will keep good a long time; how long we cannot at present state.

W. St. John M.—Mr. Sydney Smyth's method of working the solar camera gives good results and is very rapid. It is described in our last Year-Book. He uses 7½ grains of bromide of potassium and 42 grains of chloride of ammonium, with three grains of gelatine, in an ounce of water and a 50-grain silver bath. Mr. Walter Woodbury recently sent us one of the most charming developed enlargements we have seen. He uses a mixture of iodide 6 parts, bromide 2 parts, and chloride 1 part, and a 60 grain nitrate bath. A detailed account of this method will appear in our forthcoming Year-Book. The magnesium light is rather expensive at present for enlarging purposes. There is no good actinic artificial light to be had at a cost of a few pence an hour.

James Cooper.—The defect probably arises, to some extent, from the silver solution being repelled by the film, and if the remedies you have tried do not remove it, we can only recommend you to try another collodion. Do you wash the carrier frequently from traces of silver solution and then dry carefully? And do you put clean blotting paper at the corners for the plate to rest on.

Bad Bath.—It is probable that your bath is weak, and has an accumulation of organic matter in it. The latter would cause fog: and the former condition, especially if your collodion be somewhat repellant and fully iodized, would cause the image to be formed chiefly on the surface. A new bath will probably be your best remedy. You must describe your glass-room and mode of lighting a little more fully, to enable us to form an opinion on the subject.

An Amateur.—Your mode of proceeding was correct, and the result is doubtless correct also. The equivalent focus of a quarter-plate lens is generally about six inches. You are misled by the focus being commonly advertised as 4½ inches. This refers to the focus from the back-glass, not to the equivalent focus.

An Old Subscriber cannot have been a very attentive reader, or he must have seen the information repeatedly given as to the registration of photographs. They must be registered at Stationers' Hall, according to a prescribed form, copies of which are supplied by the Registrar at one penny each. The charge is one shilling for each picture registered. Our publisher will undertake the registration, if you send the form properly filled up to him with one shilling and three pence for each picture to be registered. He will also furnish you with further details. 2. You may mix the developing solutions, &c., with the hypo, for precipitating the silver. It is better to recover the silver from washing waters as a chloride. It is difficult to recover the silver from the precipitates of gold solutions, unless you make your own chloride of gold, in which case the silver may be recovered as a chloride.

C. O. P.—The opening of a door, the changing from the place where they are first placed to dry, into a box, will cause sufficient change of temperature in the slowly-drying film to cause markings of irregular drying. A box with a hot brick or a hot iron in it forms a good impromptu drying box. If you use a candle or gas light in your dark room, screen it with orange-glass. Another sample of collodion or a preliminary coating, are the only further remedies for the film leaving the plate. There are various professional photographers who give lessons. We can, if you send us an envelope, send you some addresses. Attendance at the photographic meetings is a very good educational aid.

Nemo.—We will include the recipe in question if we have space. Our correspondent should not complain of being made a "chiffonier" if we refer him to a back number or back volume for a recipe. We can scarcely reprint such matters every time a reader may require them, especially if we refer him to a number which can be purchased for a few pence.

Helioaristotypea.—We shall have something to say on Messrs. Helsby and Co's. pretty specimens of printing on opal glass, designated by this name, in our next

J. S.—Your communication on nitrate of soda in our next. A head half an inch long is quite large enough to take with the lens in question. 2. If you take it larger, you have to approach too near to the sitter, and thus cause distortion. 3. Adding too much alcohol will cause turbidity and precipitation in the developing solution. 4. Mr. Hart's test-paper should be applied to the lime solution before adding the gold. 5. No; do not add acid. 6. No. 7. Yes. 8. Iodide of potassium, added to a silver solution, precipitates a part of the silver as an iodide.

A Northerner.—Thanks for your communication. It shall appear shortly. Several Correspondence in our next.

Photographs Registered during the Past Week.

Mr. Alfred Moore, 2, Ethelbert Terrace, Margate,
Three Photographs of Rev. Josiah Bateman.

Mr. Thomas Ward, Aswell Lane, Louth, Lincolnshire,
Photograph (from Oil Painting, by Bennett Hubbard, Esq.) of the Prize Steer at Smithfield Cattle Show, 1864, the property of J. W. Kirkham, Esq.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to Thomas Piper, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

All Communications for the Editor to be addressed to 32, Paternoster Row.

Letters to be called for.—A correspondent asks us to call the attention of advertisers to the post-office regulation which decides that letters, merely addressed with initials, to be left at some post-office until called for, will not be delivered.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 329.—*December* 23, 1864.

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PRODUCING A NON-ACTINIC COLOUR IN NEGATIVES.

ATTENTION has recently been called in France to the importance of procuring a non-actinic colour in the dense parts of negatives. M. Cassan, in a recent communication to the French Society, insists upon the importance of this condition, and states that he has discovered a method, which he does not at present divulge, of converting the grey deposit into red, yellow, or green, rendering it non-actinic without increasing its thickness or rendering the negative hard. Such a method would possess the greatest possible value to the photographer. What photographer is there who has not examined with a technical delight the exquisitely-delicate gradations of a good iron negative before it has been intensified, and has not regretted the frequent loss of some of that delicacy and crisp detail, after it has been made sufficiently intense for printing, by piling up silver upon it? M. Cassan professes to have discovered a method of imparting the necessary printing intensity without increasing the deposit. From the discussion on the subject, which we give on another page, it will be seen that the only suggestion as to the means employed made at the Society, pointed to the possibility of using a coloured varnish, which M. Cassan says, would defeat the object, as the shadows and lights generally would be rendered yellow and non-actinic.

M. Piard has since communicated to the *Moniteur de la Photographie* the results of some attempts to produce coloured negatives by means of salts of mercury and iodine. But in these applications there is nothing new to photographers in this country, who are for the most part familiar with the various tints of yellow and green which may be thus produced. In these, moreover, there is additional deposit added to the picture, and a form of deposit which, except in skilled and careful hands, is very likely to produce hardness.

M. Piard, in a subsequent communication to the same journal, suggests, as an improved mode of applying the mercury and iodine, their use in the form of vapour. This will be found identical with the method we employed nearly 4 years ago, and described in these pages in April, 1861.

It is tolerably clear that, if the method of M. Cassan have the advantages it claims, it must be effected by other agents than mercury and iodine. Neither can it be satisfactorily effected by means of a coloured varnish, as suggested by M. Humbert de Molard; the reasons urged by M. Cassan being tolerably conclusive against such a method.

What method can be employed, then, to give a sufficiently non-actinic colour to the lights of a thin picture, without colouring or injuring the transparency of the shadows? The subject is worth the attention of experimental photographers. The application of a solution of the iodine will convert the grey deposit into an olive tint, or yellow, according to the amount of action it is suffered to exercise. But in this case something, however little, is added to the deposit; and the film is, moreover, apt to be in some cases acted upon by light. The application of dye of some kind, which may saturate the more or less porous deposit on the lights, and be readily washed away from the film in the parts where there is no deposit, constituting the shadows, might possibly answer; but the dye must be one which is not bleached by the action of light. We have made a few experiments upon varnished and unvarnished negatives, using Judson's dyes, both yellow and red. To some of the unvarnished negatives to which the colour was applied, the colour remained to some extent in the lights, and was quite removed, by washing, from the shadows. The colour was best seen in such cases by examining the back of the negative. The dyes, when applied to a varnished negative, coloured it deeply without difficulty; but the shadows were coloured as well as the lights, although in a less degree. We have had no weather in London which has permitted of comparative printing experiments, so that we cannot speak of the practical value of the colour conferred.

The subject is, however, an interesting and important one, and worthy of the attention of the ingenious and experimental photographer.

PHOTOGRAPHS ON OPAL GLASS.

ONE of the especial features of photography in the present day appears to be the revival of old types in new and modified forms, and with new names. An amusing instance of this tendency has been illustrated by the revival of an old style of picture under the new and singularly uneuphonious name of the "Toovytypes." Some examples of the pictures thus designated were recently exhibited at a meeting of the North London Photographic Society; they were, notwithstanding the unpromising name, very exquisite examples of printing on opal glass. Curious to trace the origin of the new name under which the old style of pictures were exhibited, we examined the account of them given in a contemporary. The search was unsatisfactory. We found that a method of colouring and finishing photographs by waxing them and attaching them to glass, the principle of which has been patented over and over again in this country, during the last dozen years, under various names, as we described in a recent article, is styled for some reason unstated, by Mr. Wenderoth, of Philadelphia, who invented or re-invented the method six years ago, Toovytype. This gentleman states that in place of the "Toovytypes" he now produces prints on opal glass, hence, by some process of literary legerdemain, the latter class of pictures are also dubbed

"Toovytypes." There is not, perhaps, much in a name, and we have no objection to this except that it is ugly and unmeaning.

It may, perhaps, be as well to inform our readers who may be disposed to experiment in printing on opal glass, that the process is not only an old one, but is also, and has been for the last eight years, protected by patent. In February, 1857, Joseph Glover, and John Bold, obtained a patent for the production of photography on opal glass, of which Mr. Squire became the purchaser, or agent, and exhibited some very fine specimens, the prepared glass for which, both with matt and polished surface, he at that time kept in stock. The process did not come into general use; but has been revived several times since, and since we have heard of no effort to restrain their production, it is probable that the patentees have abandoned their claim.

There are several methods of producing photographs on opal glass. Those produced under the patent to which we have just referred, were, if we remember rightly, produced by the collodio-albumen process, the prepared plate being printed by contact with a negative, developed, and in some cases, toned with gold. The tone was a fine grey or black. They may be produced by camera printing with wet collodion, but great care and skill are required to get a brilliant picture with detail by reflected light, and of rich vigorous tone. Soon after the publication of Glover and Bold's specification, we produced some priuts on opal glass in this way. We then found that, to secure anything like success, it was necessary to use an old, deep-coloured collo dion, which worked without the slightest tendency to reduction in any part, except where light had acted. The plates prepared in an acid positive bath, were exposed in the camera in the ordinary manner employed to produce transpareucy, slighty under exposed, and developed with iron. After fixing they were treated with bichloride of mereury, followed by a dilute solution of ammonia, or hyposulphite of soda, which produced a dark brown or black tone.

They may be printed on albumen, a surface of which, salted as albumenized paper, is applied to the surface of the glass. The plate is excited in a dish or dipping bath, the strength of the nitrate of silver being governed by the proportion of salt in the albumen; five or six grains of salt to the ounce, and a fifty-graiu bath will answer. The exposure is longer than for albumenized silver, and it is difficult to examine its progress. The toning and fixing are conducted in the usual way. Collodion with chloride of silver may be used, but in the experiments we have tried the image is weak and grey. Probably, the addition of some substance forming an organic compound with silver might rectify this defect. By using a similar addition, the Wothlytype process would probably answer, and give good results, but we have not tried it.

There are two or three important drawbacks to these pictures, which in effect are very pleasing. It is difficult to meet with opal glass with a suitable surface, unless it be especially prepared for the work. The common samples are not flat, and have a bad surface, unsuitable for producing a good effect, and dangerous to the negative. If printed by superposition, it is difficult to judge of the process of printing, as they cannot be turned back like paper, aud examined. And most fatal of all, they are very fragile.

All these drawbacks are removed or ameliorated in the application of opal glass, introduced by Messrs. Helsby and Co., of Liverpool, under the startling name of *Helioaristotypia*. The opal glass we understand, is especially prepared so as to secure a perfect surface; the printing is effected in the camera; and the question of fragility is rendered unimportant by the safe and elegant mounting in which they are set. The examples before us are small oval vignettes, of a size suitable for brooches or bracelets, but these are set in beautiful morocco cases, the pictures being surrounded with maroon velvet. The details of the method by which they are produced are not at present divulged; a process recently described in a contemporary as being that by which these pictures are produced, is disclaimed by Messrs. Helsby, who, in a letter to us, state the writer in question to be wholly in error. The tone of the specimens before us, is a pure black or grey, not unlike the tone of many we have obtained by the wet collodion process and camera printing as described above. It is probable that the method described by Mr. Blanchard in the Photographic Year Book for 1864, as a successful mode of producing transparencies for the magic lantern would answer well. The pictures of Messrs. Helsby and Co., are hermetically sealed after finishing, by cementing a piece of fine white glass over them by means of canada balsam, and then placing them in the hands of the lapidary to grind, bevel, and polish the edges, in a manner similar to that employed by Mr. Skaife in finishing what he terms "chromo-crystals."

As pictures, the examples before us are very charming, graceful, and artistic in arrangement, and perfect in photography. The mode of finishing renders their permanency scarcely a matter of question, and we know of nothing more pleasing or suitable for setting in jewellery.

FATAL EXPLOSION OF OXYGEN GAS IN A PHOTOGRAPHIC ESTABLISHMENT.

As many of our readers are engaged at this season of the year in exhibiting their photographs by the aid of the magic lantern, we think it right to call their especial attention to an accident, by which a photographer and his son have been killed in Manchester, whilst preparing oxygen gas for this purpose. We condense the account from a daily paper:—

On Saturday night, in Manchester, the bursting of a retort in which oxygen gas was being generated, killed the operator and his son, aged two years, severely injured his wife, causing her premature confinement, and destroyed the room and its contents in which the explosion occurred. Mr. Samuel Crowther, formerly, and for some years property-master at the Theatre Royal, Peter Street, carried on business in that street as a photographic artist, and besides taking portraits, he dealt largely in gases used for the production of the oxy-hydrogen light, which he sold to the proprietors of exhibitions, as well as to country theatres; and these gases he made in his own house. At the back of the shop, a door opened into the kitchen, and the kitchen fronted a yard, open, through a court, to the main street. Oxygen gas for the oxyhydrogen light is made from chlorate of potash and binoxide of maugauese heated in a retort. On Saturday night, Crowther was making this gas, and he had his retort, an iron cyliuder, on the kitchen fire. The boy, named Arthur, was in the kitchen, and Mrs. Crowther was in the doorway, between the kitchen and the shop, when, about a quarter past 5 o'clock, a loud report and a violent shaking of the house alarmed the neighbourhood. Mrs. Crowther ran out of the shop, exclaiming, "Oh, my husband and my child!" The glass in the shop was broken, but the interior of the kitchen was a complete wreck. Partly buried in the ruins lay the lifeless body of Mr. Crowther, the head battered, the legs broken, the clothes buruing. The little boy was in a corner, frightfully injured, but yet alive. The fireplace was destroyed, a heap of *debris* covered the hearth; the front wall of the kitchen bulged outwards, and it afterwards fell iuto the yard. Mrs. Crowther had been struck, and severely injured in the back, and she and the boy were taken to the infirmary. The child died soon after its admissiou. The mother was found to have received two deep lacerated wounds in the back. While these wounds were being sewn up, the poor woman was absolntely iu the pains of labour, and within an hour or two, she gave birth to a girl. Some time afterwards, both mother and infant were reported to be doing well; but the mother did not know that her husband and the little boy were dead. The cause of the accident can be conjectured with some confidence. The newly generated oxygen gas leaves the retort by means of an iron pipe about a yard in length. It then passes through water to be purified, and being thus cooled, flexible pipes serve to conduct it to the bags in which it is carried about. It is supposed that the iron pipe had become stopped up, so that the rapidly generating gas, imprisoned in the retort, ultimately burst it. The retort could not be seen on Saturday night, being probably hidden in the ruins. It is said that Mr. Crowther kept his own retort in good order; but that on this occasiou, he was using a retort belonging to another person. As to the cause of the accident, the *Manchester Examiner* says:—

Probably, nothing but the retort and the apparatus, their condition and position, will furuish a clue to the cause of the accident. As yet, everything is supposition and conjecture. Without at-

taching any weight to these suppositions, we state them simply as suggesting the points that will have to be inquired into. One, of course, is that Mr. Crowther himself may possibly have been over hasty, or wanting in some necessary precaution—a supposition said to be at variance with his known caution, skill, and experience. Another is, that the iron pipe by which the gas escapes from the retort to the purifier may, either in Mr. Crowther's hands or earlier, have become stopped, in which case the generated and generating gas confined in the small retort would inevitably burst it. Had the iron pipe been perfectly free from obstruction, it is thought that any undue pressure arising from the too rapid generation of gas would have ripped open or disjointed the flexible tubing before the pressure on the retort could have been dangerous. It is said that flexible tubing often does give way in this manner before the danger-point has been reached, and that it thus acts, as it were, as a safety-valve; and Mr. Morgan recently had his right hand burned by the heated gas, through a flexible tube splitting. Another supposition, is that there may possibly have been some unsuspected impurity in the chemicals used to make the gas from. For instance, if a little coal dust had become mixed with the manganese in the heated retort, it would give off hydrogen, which, as is well known, forms an explosive mixture either with oxygen or common air. It is also open to conjecture, for aught yet known to the contrary, that the explosion may have been caused independently of the working of oxygen gas, although the apparatus has shared in the general destruction. Mr. Crowther may, unknown to any one, have been handling some dangerous substance, and may have had an accident with it. A gentleman who was in the premises immediately after the explosion concluded from the smell that there had been an explosion of ether.

At present, of course, conjecture is comparatively useless. Mr. Walter Woodbury, of Manchester, writing to us on the subject, expresses a conviction that the air in the retort may have got cooled to a certain extent, thus causing a vacuum, and the water being drawn out of the purifier and coming into contact with the red-hot retort, thus caused an explosion. Whatever may have been the cause, the event will act as a warning and incentive to caution, we trust, to all engaged in the manufacture. In the last form of retort, as Mr. How mentions to us, the pipe, instead of being tapped into the retort, is attached to a cover, which is ground so as to fit the neck of the retort, and form an air-tight connection, which is, however, detached with the slightest force, so that in the event of an explosion the cover is simply blown off, and the worst event is the loss of the gas without further damage. The method of preparing oxygen, recently discovered by Mr. Robins, although a little more costly than the ordinary method, being free from danger, is well worthy of the attention of the inexperienced.

Since writing the above we have received details of the inquest; from which it appears that the explosion was due to an adulteration of the manganese, probably powdered coal or a similar material, which, generating hydrogen in the retort, produced the well-known explosive compound. We especially call attention to the evidence of Dr. Roscoe, who, with commendable interest in the subject, came forward and gave the results of an examination he had voluntarily made. After some preliminary evidence,

Henry Enfield Roscoe, B.A., professor of chemistry at Owen's College, said: I think it right, sir, to explain that I have come here merely because of the report of this accident in the newspapers this morning. Being much interested in the preparation of oxygen, and indeed all gaseous mixtures, I thought it was due that a thorough investigation of the cause of this accident should be made. I therefore wrote to Captain Palin, the chief constable, requesting him to allow me, under the circumstances, to make whatever examination I thought proper. The request being granted, I visited the scene of the explosion with Captain Palin, and obtained the bag just now produced, and identified by the lad. When this bag came into my hands it was found lying upon the floor, near the fireplace, in the deceased's shop. I took it to my laboratory at the college, and examined its contents. They were a mixture of chlorate of potash, manganese, and a black substance—either lampblack, powdered coal, or soot, the latter I believe has been added for the purpose of fraudulently adulterating the manganese. I have reason to know that such adulterations are very often made. A case occurred under my own notice about twelve months ago, in which an explosion took place; and it was found that the whole of the manganese, or rather, what should have been manganese, was nothing but powdered coal. Fortunately, no lives were lost upon this occasion. It cannot be too widely known that the effect of the addition of this coal, or lamp black, or soot to this chlorate of potash mixture, is to make a substance which is as dangerous as gunpowder, and which explodes with a most frightful force. I have brought a tube with me, and could, if proper, easily give the jury an illustration. The usual proportion in making oxygen gas are about 3 lb. of chlorate of potash to one of manganese. I have not examined the contents of this bag, but one of the constables (Police-constable Davenport), under Captain Palin's orders, brought me some specimens of manganese. One specimen, which was said to come from Mr. Morgan's, and which was no doubt the same as this in the bag, instead of being manganese, contains about 25 per cent. of soot, or powdered coal, but most probably soot. The other specimens were said to have come—one from Mr. Hughes, Chemist, Cateaton Street, and the other from Messrs. Mottershead and Co., Market Place. They were both pure manganese. I have nothing more to remark, but I thought it my duty to come forward and make this statement, because these things have occurred before; really it is a most serious, although common thing. At the present time of the year accidents from ignorance upon this point are especially liable, because persons make use of this oxygen gas for Christmas exhibitions. An accident of this kind might happen to any one of my college pupils, who in working at home often use the oxygen gas, and who go to chemist's shops to get their chemicals.

The Coroner said the public were much indebted to Professor Roscoe, and that gentleman, in reply to questions, said that manganese was black, and very much resembled soot. Its price would be about 3d. per lb. If a quantity of the material which was said to have come from Mr. Morgan's was put into the retort, an explosion must have occurred, however good the apparatus might be.

F. W. Morgan, optician, said he procured from Mr. Hughes, chemist, Cateaton Street, their usual mixture for making oxygen gas, namely, seven pounds of chlorate of potash and three pounds of oxide of manganese. The messenger returned with two parcels, saying that there were only six pounds of chlorate of potash. That being the case, in order to equalize the proportions, he took away from the manganese about three-quarters of a pound, and that I gave this morning to police-constable Davenport. (It was that from which Professor Roscoe's examination was made.) Could swear that what he handed to the constable was precisely the same as that he got from Mr. Hughes's. It was brought from there on Saturday, and has never been interfered with since. In making his gas, he generally used a thin wrought-iron retort, which would lessen the force of an explosion, should one occur. On Saturday he used one of these retorts, and placed it over a slow fire. It had been on about a minute, and he had hold of the indi-rubber pipe to keep it straight, so that the gas might have free access to the receiver, when he became conscious of a blinding flash and soon found himself upon the floor. An explosion had taken place. Had made oxygen gas for twelve years, but never had much experience in chemistry. He then sent the materials and a retort to Mr. Crowther, to ask him to make some gas for the exhibition.

The Coroner: Why, after this explosion took place, in consequence of the stuff you put in the retort, did you send the same stuff to him?

Mr. Morgan: It did not strike me there was anything wrong with the manganese. I thought I had not put sufficient manganese in, and this was why I told my man to buy an extra pound of manganese at Mottershead's, when he went to borrow the retort. It also crossed my mind that somehow the piping might have got bent, but I had no other theory about the explosion. We had often made gas at our place, but there was never an explosion. The materials we previously used were also got from Hughes's. When I heard that there had been an explosion at Mr. Crowther's place as well as mine, I thought that there must be something wrong with the manganese or the potash. I did not know it was a common thing to adulterate manganese with coal. If the material produced (in the paper bag) is all that is left, the deceased must have used more than three times what he ought to have used.

Some further evidence was given, and Mr. Hughes stated in examination, that it was impossible for any foreign substance to have been added to the mangenese whilst in his possession. Lampblack, the only material in his warehouse possible to be added, was twice as expensive.

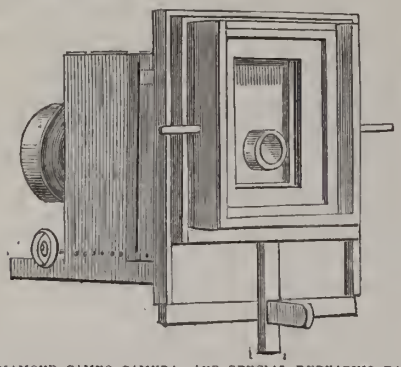
Finally a verdict of manslaughter was returned against Mr. Hughes, who was committed for trial.

A correspondent of the *Times* makes a suggestion to all engaged at present in making oxygen. He says:—When a new sample of manganese is used, put a teaspoonful on a shovel mixed with half its own weight of chlorate of potash, and heat the mixture over the fire. If it flashes into flame or detonates, the manganese is dangerous, but if small scintillations run over the surface quietly, the mixture is harmless

DIAMOND CAMEO PORTRAITS.

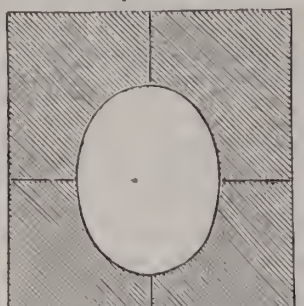
We complete our report of Mr. Window's paper on this new style of portraiture, which appeared in our last number, by giving illustrations of several of the new appliances which were laid upon the table, and explained to the meeting. The convenience of having all the respective parts of the apparatus for any particular process, made similar in dimensions by all manufactnrers, is evident; and in this process this seems to hold good more particularly, as the several parts have to combine together to form the finished design, and any deficiency of the parts would tend to mar the appearance of the whole. Thus, if the masks and dies be of different sizes or shapes, the pictures will show a margin after embossing very detrimental to their effect. If the movement of the repeating back be not absolutely similar to the spacing of the ovals on the masks, the pictures will be all uncentred and crooked in the ovals. Also, no pictures printed of different dimensions will fit into the pretty new diamond cameo albums now sold expressly for their use, while, on the other hand, albums of other sizes will be unsuited to the generality of the pictures.

Recognising the inconvenience that may be spared by having one fixed gauge for all the parts, we have given below accurate representations of the exact form and dimensions of the original ovals and masks, which decide those of the dies and other apparatus.



DIAMOND CAMEO CAMERA, AND SPECIAL REPEATING BACK.

The cut gives the repeating back with the ground-glass removed, showing the tube through which the image passes, and which cuts off all the picture that is not required. The short levers at the sides and bottom are for the purpose of moving the plate in the required direction, and locking it there. The back is shown in the position for taking the top picture, *i.e.*, in the middle of its horizontal movement, and at the top of its course vertically.



THE STEEL TEMPLATE FOR CUTTING OUT THE MASKS.

This template is an oval aperture filed out of a piece of steel plate, and bevelled to a thin edge. After being properly fashioned, the steel must be well hardened, or the knife constantly travelling along the thin bevelled edge would soon destroy the contour line. Many photographers could make these for themselves, but those who cannot may have them made by any working optician, and probably also by any working cutler. The cross-lines on the template serve as guides to determine its position when used on the mask diagram.

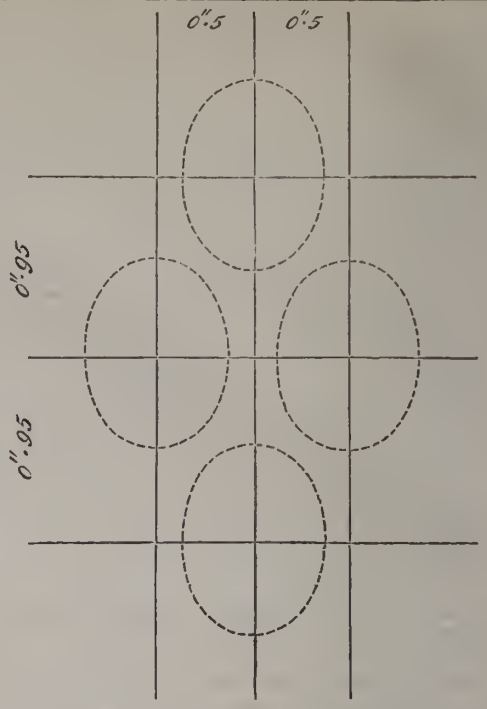


DIAGRAM FOR CUTTING THE MASKS FOR PRINTING.

To make a mask for printing, take a piece of perfectly opaque paper, and draw upon it three vertical and three horizontal lines, perpendicular to each other, and spaced as shown in the above diagram. Then take the template and place it so that its cross lines correspond with those lines of the diagram which cross in the dotted ovals, one after another, and cut out the oval with a sharp knife.

ON THE TANNIN PROCESS.

BY JABEZ HUGHES.*

With respect to the time required for exposure in the camera, I am sorry I cannot say, as some have done, "Give the same as for wet plates." I have tried them many times against wet collodion, and with alkaline development, they have required twice the exposnre of the wet plates developed with iron; if developed with acid pyro, they required six times the amount of exposnre. I always have in view the kind of development I intend to use when I expose; and I like to give as long as I can to each snbject, knowing that, while over-exposure may be modified, there is no remedy for under-exposure. When the conditions permit, I prefer to continue the exposnre long enough to snit the acid pyro-developer; bnt when I cannot do this, and qnickness is essential, I then give as long as I can in the camera; I use the alkaline pyro developer, and hope for the best. It is not always necessary that a person should work qnick; there are many snbjects to which yon can give five minntes, just as well as you can give one. When a picture is under-exposed, and we try to make it up by developing, I look on the developer as being overtaxed, as being called on to do not only its own work, but some part that light ought to have done too. No wonder, then, that the developer fails. I think it better to proportionally distribute the labour, allowing the light to do its full share. I think it lamentable to pnt the snn on short time, or the plate on short commons. I sympathise strongly with a photographer when I see him struggling with an under-exposed plate, pouring his developer off and on, anxiously staring into the deep shadows for the detail that won't come, and dreading the fog that generally does.

*Continued from page 306.

I employ Dallmeyer triplet lenses for my outdoor work, using as small stops as circumstances will permit. My exposures have varied considerably; with the negatives before you the average being about five minutes, using a No. 2 triple and a medium stop. One negative is here taken with a No. I triple that had only 30 seconds; and a print is here from another—a No. 4 triple that had 15 minutes; but the 30-second picture was assisted by alkaline development, and the 15-minute one had acid pyro. The quick developer was thus used for the short exposure, and the slow one for the long exposure. Where circumstances will allow, I think it good to use two plates to each view: not only are you more sure of having at least one good plate, but, by taking advantage of the different nature of the two developers, an error of exposure may be corrected in developing the second plate.

As the plates develop quickly, any convenient method may be used to hold them. They may be held in the hand, placed on a levelling stand, or a pneumatic holder with a handle may be used. This latter is my method. Wet the plate well, so as to moisten the film; and if the plate has received the minimum of exposure, proceed to develop it by the alkaline method. Make up a solution of

Carbonate of ammonia	...	40 grains
Distilled water	... ...	20 ounces.

Filter, and it is ready for use; and it will keep indefinitely. Pour sufficient over the wetted plate to amply cover; after flowing over, return the solution to the developing-glass, and while there add to each fluid ounce about as much dry pyrogallic acid as will lie on a shilling; it will dissolve immediately, and will not need filtering. Return the solution containing the dissolved pyro to the plate, and the image will quickly reveal itself. Allow the developing to go on till the details are seen by *reflected light*; for, on looking through, scarcely anything will be visible: wash the plate well, and proceed to intensify. This is done in the usual manner, with the acid solution of pyrogallic, to which is added, at the time of using, a few drops of (say) a 10-grain solution of nitrate of silver.

The following are serviceable solutions for use:—

Pyrogallic acid	... ...	2 grs.
Citric acid ...	... ...	1 gr.
Distilled water	... ...	1 oz.
	or,	
Pyrogallic acid	... ...	1 gr.
Glacial acetic acid	... ...	½ drachm.
Distilled water	... ...	1 oz.

After the alkaline pyro has been well washed away, pour over the plate sufficient of the acid pyro solution to cover it: do this before adding the silver to it. The alkali that may remain in the film will thus be neutralized; return the solution to the developing-glass, add a few drops of the silver solution, and proceed with the intensifying. The previously weak image will quickly change into a strong and vigorous one. It is advisable not to make the image too dense in this stage, but to defer some portion of the intensifying till after the fixing in the hyposulphite. The fixing and successive washing completed, the plate had better be examined, and the little additional intensity required given in diffused white light. I attach importance to this recommendation, as a great deal of the actinic density of these dry plates depends not so much on the quantity of the deposit as on the colour, and this cannot be definitely known till the plate is fixed.

If the plate has had what we may term the normal exposure, it requires only to be well wetted, and either of the above acid solutions of pyro, to which at the time of using a few drops of the silver solution are added, to be flowed over the plate, and the development will proceed almost as quickly as in a wet plate.

It is desirable, in the first instance, to bring out the image with the least quantity of silver solution. The development can then be prolonged till all the deepest details are out, without the highest lights becoming intense. When the image is thus all developed, then is the time to add more silver and proceed with the intensifyiug, never, however, continuing it to the full extent, but leaving the final touches to be given after fixing. If the picture appears over-exposed, the greater part of the intensifying should be done after fixing; but if under exposed, then as much intensity as can safely be given should be done before fixing, because intensifying after has a tendency to increase the contrasts in the picture.

The negative, thus duly intensified, has only to be dried and varnished, and it is ready for printing.

These negatives have always a more or less veiled or slightly foggy appearauce; this is only seen by looking at them: on looking through, the shadows are quite pure and transparent.

I look on the development as being by far the most important part of the process, and the one in which there is the greatest scope for the exercise of judgment. It was the reproach of the tannin process in its early days that all the pictures were of wiry hardness. My experience shows that there is no necessary reason why the pictures should be hard. If the exposure be sufficient, it is all a question of development. The first object is to get ont *all* the picture in the deepest shades before any strong density is produced in the high lights. This done, the intensifying can be calmly proceeded with; when, as in the old-fashioned way, the developing and intensifying was conducted simultaneously, there was always a danger of making the high lights too intense before the details were brought out in the shades. If, however, only the weak image be first produced, then the manipulator has it quite under control whether he shall produce a soft or a hard picture; for—if the exposure be enough—all weak pictures are soft pictures, and it is only as they are made too intense that they become hard. The exercise of judgment is required to know how far to go, so as to secure vigour without losing softness. When using the alkaline developer, there is no fear of the first or purely developing stage being past; for the developer, no matter how long you keep it on, in reason, will only make a weak thin image, it is in developing with acid pyro and silver the error may be made. If, however, only a very little silver be added to the developer, aud patience be used, almost as weak an image may be produced by acid pyro and silver as by carbonate of ammonia and pyro. A well-developed weak image being obtained by either means, all the elements of a soft yet brilliant picture are secured, the rest being the exercise of skill in intensifying.

By attention to these points hard pictures may be avoided, and soft ones secured, not only by the tannin, but, I believe, by every other dry process.

A few words may here be said as to the merits of acid and alkaline development. I consider alkaline development to be a very valuable discovery, enabling us to bring out an image with certainly less than one half the exposure otherwise required. This materially increases the usefulness of dry plates, and opens out untrodden paths of photographic discovery. The images produced by this means seem every bit as perfect as by the acid method; in fact, when the plates are done, I cannot tell the one from the other. I use the two plans accordiug to requirements; for, while distinctly recognizing the value of the alkaline developer, I by no means pin my faith to its exclusive use. Where the circumtances are favourable, I still adapt my exposure to suit the acid method, as being the safer of the two. If I expose my plate for alkaline development, and I give too little time, I have lost my picture, for the acid method will render me no assistance; if I over-expose, then the acid method naturally comes to my assistance. In like manner, if I expose for acid development, and give too little time, the alkaline developer will be my friend. By this means I have two strings to my bow.

On the whole, then, I look upon this discovery as a

reserve of force, a something wonderfully useful to have recourse to when the usual means are quite inadequate; and as its usefulness is by no means confined to this process, I strongly recommend all dry-plate workers to add this new force to their powers.

I have already spoken of the image produced by alkaline pyro as being extremely thin and weak; it has been aptly termed a *phantom* image. Sometimes, with very short exposure, only the general outlines of a picture make their appearance. I have then found it advisable to increase the power by adding more dry pyrogallic acid to the developing solution. In rare cases I have used as much as ten grains of pyro to one ounce of the carbonate-of-ammonia solution, and have thus extracted a latent image that otherwise would not come forth. This, however, is a potent photographic spell for bringing spirits from the vasty deep, that can only be recommended in exceptional cases, as there is always a much greater chance of raising the spirit of darkness, Fog, than the image we desire.

I have not found any advantage in increasing the strength of the carbonate of ammonia above two grains per ounce. Carbonate of soda has never succeeded so well with me as the ammonia-salt.

The virtues of hot solutions have been duly recorded for bringing out images with very short exposures; and, theoretically, a hot solution of alkaline pyro ought to be a most powerful developer. I cannot compliment myself, however, on my few essays in that direction; the results were rather humiliating than otherwise. Referring to these extreme and daring methods of development, I am reminded of an anecdote of three men, who applied for a vacant coachmanship. A test question was put to each, how near he could go to the edge of the road without going over. The first said he could go with perfect safety to within an inch; the second could go to a hair's-breadth; but the third said he always kept as far as he could from the edge, and preferred to drive down the middle of the road. When I have been pushing the development in some refractory plate, that has had scarcely a gleam of light, hunting up the latent image that declined to put in an appearance, dosing it with fresh and more powerful stimulants, pitching it in hot and strong, defying fog, and treading on the very brink of destruction; under these circumstances, I have thought that, after all, it would be safer "to drive down the middle of the road."

The appearance of the plate after exposure will sometimes suggest the best mode of development. If the image be visible on the plate when it comes from the dark slide it has certainly been sufficiently exposed, so as not to need alkaline pyro. Sometimes on wetting the plate only, the image will spring forth; in such case also the alkaline pyro will not be needed. Also when the image comes out on the application of the carbonate-of-ammonia solution, before the pyro is added, the plate may be well washed, and the remainder of the development entrusted to the acid pyro and silver. In this latter case the acid pyro must first be flowed over the plate to neutralize any ammonia-salt in the film before the silver is added. If this precaution be omitted in this and analogous cases, there will be a certain fogging produced.

In the absence of any of the appearances named, the judgment must be used as to which developer to employ. It is sufficient to say, that it is always safer to use the alkaline than the acid pyro where there is a doubt, as, although a plate with abundance of exposure will always make a better negative if developed with acid pyro, yet, be the exposure ever so great, a picture can with care always be made from the alkaline-developed image.

I have only now to close by briefly summarising what I have so circuitously stated. In short, then, I prepare my plate by cleaning the glass, coating it with collodion, sensitizing it with the silver-bath exactly the same as for taking wet negatives by iron-development; the sensitized plate, when taken from the nitrate bath, is put into a bath of distilled water, instead of being put into the dark slide; it remains in this water till another plate is sensitized; then it is washed for about a minute under the tap, and a 15-grain solution of tannin is flowed over, and it is allowed to dry in darkness. When dry, the edges are varnished with black varnish, and the plate is ready for use. It will keep, for certainty, a month or two. If the exposure be sufficient, the development will be quite easy with the old-fashioned pyro-developer and a few drops of silver solution. If the exposure is short, the development must be commenced with carbonate of ammonia and pyro, and finished with pyro and silver; and—this constitutes the whole process.

I cannot conclude without stating that I am glad of the opportunity of bearing testimony to its simplicity and great usefulness; and in the name of the workers in tannin (and their name is many) I thus publicly thank Major Russell for first introducing and perfecting the tannin process.

ON THE ACTION OF LIGHT UPON SOME OF THE HALOID SALTS OF COPPER.

BY M. B. RENAULT.

If we immerse a plate of copper in a mixture capable of yielding up its chlorine to it, its surface becomes covered with a continuous layer of microscopic crystals, which rapidly darken in solar light, and after a certain time of exposure acquire the tint presented by the fracture of prussian blue.

If the coating of chloride be thin, before its change by the light, it is transparent, and allows the colour of the metal to be seen through it.

The presence of moisture favours the chemical action of light; in a perfectly dry atmosphere the change takes place very slowly.

To deposit a uniform and sufficiently thin coating of chloride upon the copper plate, I proceed as follows:—I amalgamate the surface of the metal by immersing it in a bath of nitrate of binoxide of mercury, dissolved in water by the aid of sulphate of ammonia.*

Water	250 gr.
Sulphate of ammonia	20 „
Nitrate of mercury	15 „

I begin by dissolving the sulphate, then I add the nitrate of mercury; the yellow precipitate formed is immediately dissolved, leaving a perfectly clear liquid, the plate of copper immersed in it; it is withdrawn after a few seconds, carefully wiped, shows a smooth bright surface. It is useless to add that the plate of copper must be made perfectly clean before immersion.

Amalgamating the copper plate may be dispensed with, and sensitise it immediately, but then a uniform and spotless coating is more difficult to obtain.

The sensitizing bath may be any liquid which will cede chlorine, bromine,† or iodine to the plate. Suppose we employ bichloride of copper slightly acidulated by hydrochloric acid. The solution must be moderately strong:—

Water	200 gr.
Bichloride of Copper	40 „
Hydrochloric Acid...	10 „

The copper plate immersed in this solution for a few moments is withdrawn and washed, then dried with bibulous paper, without rubbing so as to scratch the coating. It is not necessary to operate in a completely dark room, it is only necessary for the light in the apartment not to be too strong. The plate is then exposed to the solar rays under a negative, and after an exposure which varies with the intensity of the light and the tint desired, black or copper blue, it is withdrawn: it presents a positive image of the negative without any metallic reflection. As the grain of the surface of the plate is of microscopic

* The solubility of nitrate of mercury in a solution of sulphate of ammonia increases rapidly when the proportion of the latter salt is augmented. I have constructed the curve of solubility of the nitrate of mercury in sulphate of ammonia; one of the branches of this curve, that which represents the weight, has a parallel of one of the co-ordinate axes for an asymptote.

† The bromide is more sensitive than the chloride, the iodide is much less so, and the presence of water is necessary for the change of the latter in light to take place.

tinoness, the only limit to the perfection of the positive picture is in the quality of the negative employed.

If the plate be amalgamated before immersion in the sensitizing bath, it is necessary to drive off the mercury from the plate by cautiously heating it, for a temperature exceeding 370° Fah. destroys the proof, besides the red tint of the copper, which appears in proportion as the mercury is volatilized, serves as a guide.

The chemical properties of the chloride, changed by the light and of that which is not so changed, differ so little that it is difficult to find a solvent for the one that is not also a solvent for the other. I have tried in succession, without much success, the cyanides of potassium, of sodium, and ammonium, hyposulphite of soda, the alkaline chlorides, iodides, and bromides of the same metals, sulphate of soda and of ammonia, some acid solutions, &c. This is the reason why I now limit myself, after heating the picture so as to dry it completely, to covering it while warm with a varnish which contains neither acids nor water. By this means the picture may be kept a long time without changing.

I have endeavoured to ascertain the nature of the alteration, the chloride of copper undergoes under the influence of the solar rays. An exposed plate, washed with distilled water, gave no trace of copper salt, consequently it was not formed of the bichloride. Another exposed plate, washed rapidly with distilled water, gave a light precipitate with nitrate of silver. This reaction indicated the presence of hydrochloric acid; moreover, if we regard this fact, that the presence of water greatly favours this alteration, we may conclude that an oxychloride is formed under the influence of light. The following equation:—

$$Cu^2\ Cl + HO = C^2\ O\ HCl$$

explains the reaction. Nevertheless, some explanations which I shall give hereafter lead me to doubt the formation of protochloride $Cu^2\ Cl$ upon the plate; I am rather inclined to believe that an insoluble combination of proto and bi-chloride is formed.

I shall now proceed to give some details upon a curious property of proto-iodide of copper, and also make known some of the results of the employment of the chlorides and bromides of copper, incorporated with albumen and collodion as sensitive agents.

The analogy between the properties of chlorine bromine, and iodine, and also between fluorine and cyanogen, have led me to inquire if the four latter metalloids resemble chlorine also, from the point of view I have taken, in the analogous compounds which they form with copper.

A plate of copper immersed in solution which can yield bromine to it, such as bromine dissolved in bromide of potassium, bi-bromide of copper, per bromide of iron, &c., becomes covered with a white crystalline coating like that obtained in the analogous case with chlorine. This coating dissolves in chloride of sodium, is insoluble in chloride of potassium and chloride of barium, but soluble in chloride of ammonium, ammonia, sulphate of ammonia, bromine dissolved in bromide of potassium, hyposulphite of soda, cyanide of potassium, diluted hydrochloric acid, diluted nitric and sulphuric acids (the corresponding chloride of copper is less easily dissolved in these two latter acids); insoluble in sulphite of soda, sulphate of soda, and bromide of potassium.

Exposed to the solar light,* the bromide of the plate changes rapidly, passing through the tints mentioned with the chloride, preserving, however, a deeper blue tint. We can obtain daguerrean pictures of a degree of fineness which has no limit, except that of the negative employed; the sensitiveness of the bromide appears to be greater than that of chloride, besides, the difference in the solubility of the bromide changed by light, and the unchanged bromide in certain solvents is more marked. Thus hyposulphite of soda and chloride of sodium dissolve the unchanged bromide, while these reagents, in dilute solutions, do not much change the bromide blackened under the influence of the solar rays.† We must place against this, the fact that the solvent acting upon the unchanged bromide often carries the superficial layer of altered bromide in a pulverulent but undissolved state, which appears a solution.

An exposed plate, washed in distilled water, gives no precipitate with ferrocyanide of potassium; but, like that which has been chlorided, it gives a light precipitate with nitrate of silver.

Iodide of Copper.—A plate of copper submitted to the action of iodine,* becomes covered with a similar crystalline coating, much less changeable in the light than the corresponding chloride and bromide. After an hour or two's exposure, if the plate be dried, a sketch of the negative is scarcely visible. Under the same conditions, chlorided and bromided plates change greatly.

A remarkable peculiarity is the following:—After a suitable time of exposure, if the iodized plate be immersed in a dilute solution of nitrate of binoxide of mercury, the non-exposed parts of the plate become brick-red in colour, and those which, on the contrary, have received the action of light, take the colour of proto-iodide of mercury. This characteristic reaction, added to some considerations upon the quantity of electricity disengaged in the combination of the copper with the chlorine, bromine, iodine, and fluorine, to obtain these compounds sensitive to light, will probably enable me to fix their composition.

Iodide of copper, changed or not changed by the action of light, is insoluble in chloride of sodium, nitrate of potassa, sulphite of soda, bromide of potassium, and chloride of ammonium; it is soluble in ammonia, hyposulphite of soda, cyanide of potassium, hydrochloric acid, dilute sulphuric and nitric acids, and sulphate of ammonia; the changed iodide is a little less soluble in this last reagent.

Fluoride of Copper.—The most suitable solution for fluoriding copper is the bifluoride of that metal. The plate exposed to the light, when it has been attacked by the fluorine, darkens, and becomes violet-blue, like the chlorided plate, but more slowly; the plate, before exposure, is grey-white, which proves that the compound formed is not a proto-fluoride of copper. There also are some of the properties of the fluoride changed and unchanged by light.

Changed fluoride is but slightly soluble in hyposulphite of soda, chloride of sodium, diluted nitric and sulphuric acids, and sulphate of ammonia; it is soluble in dilute hydrochloric acid, and in ammonia.

Unchanged fluoride dissolves in hyposulphite of soda, chloride of sodium, diluted nitric and sulphuric acids, and in ammonia; it is but slightly soluble in sulphate of ammonia.—*Comptes Rendus de l'Académie des Sciences.*

INTENSIFYING NEGATIVES BY COLOUR.

M. Cassan has addressed the following to the French Society.—"The want of harmony in the drawing, and the exaggeration of contrast in photographic proofs are inherent to the intensifying of the negatives, which, instead of acting simultaneously, and with uniform energy upon the lights and half-tones of the negative picture, has the inconvenience of concentrating its maximum of action upon the high lights, while its effects are scarcely evident upon the middle tones, and not at all in the shadows. From this inequality of action it results that the lights are too intensified before the tones of the flesh have acquired sufficient strength, and consequently the loss of model in the whites with thickening of the half-tones ensues.

"Non-intensified negatives cannot furnish positives sufficiently vigorous: this is an unlucky fact, for negatives developed simply with sulphate of iron, possess, although with too great uniformity, the most delicate half-tones and the minutest details in the lights and shades of the design.

"The photographer must therefore abandon intensifying negatives, and employ exclusively negatives simply developed, the *grey* precipitate of which forming the picture will be transformed into *red*, *yellow*, or *green*, colours which, by their anti-photogenic properties, and notwithstanding the apparent weakness of the negatives, produce very vigorous positive proofs, harmonious, and full of detail in the highest lights and in the deepest shadows.

"In my opinion, the advantages of this method are, 1st,

* Diffused light also acts upon the bromide, but more slowly.

† We can therefore fix proofs in bromide of copper in a manner analogous that employed for photographic proofs.

* The plate may be submitted to the fumes of iodine, or to the action of a liquid adapted to supply iodine; when it is moist, the change is more rapid.

superiority of the positives with reference to their softness and the detail in the lights. 2nd, solidity of the collodion film, which resists very strong streams of water during the preparation of the negatives. 3rd, economy in the chemical products employed in ordinary intensifying. (After developing with sulphate of iron, the obtaining a negative of the colour of yolk of egg, requires but a minute of time, and less than a farthing's worth of reagents.) 4th, the positives obtained from these negatives have not, like ordinary ones, the disagreeable quality of representing the sitter old and ugly. 5th, greater sensibility, for it requires only four-fifths of the time demanded by an intensified negative."

M. Girard remarked that is was to be regretted that M. Cassan had sent no description of the method he employed, nor comparative positives obtained from two negatives, the one intensified, the other simply developed, then coloured as described by M. Cassau.

M. Humbert de Molard supported this observation, "It is important to know" he said, "if M. Cassan's process is different from that employed for a long time by several photographers. A great many of my colleagues possess coloured varnishes, I suppose for this very purpose, and they are such as are commonly sold. When a developed negative is too pale, it is only necessary to cover it with a light yellow varnish to obtain the effect in question. The colour may be just as well communicated to the collodion itself, as to a varnish applied subsequently. Aniline colours, xanthine, &c., may be employed for this purpose.

M. Cassan, in a note on his process for colouring negatives, referred to above, says:—

"An *un-intensified* negative, coloured by my process, may be too weak or too strong, according as it has been taken with a collodion more or less iodized, sensitized in a silver bath more or less rich, and developed with a sulphate of iron bath, more or less concentrated.

"When the collodion is iodized to a suitable point, and the silver bath and iron solution are in harmony with the collodion, the colouring of the negative *invariably* brings the desired vigour, without its being possible to err by insufficiency, or too much vigour. It is therefore useless to verify the negative by transparency during the manipulation, and this is advantageous, for, in certain cases, the *precise* point of *ordinary* strengthening is so difficult to judge, that, without a little risk, it is almost impossible to obtain *successively* two negatives of similar model with *identical* vigour, notwithstanding it has been exposed the same time, and the same baths are employed.

"By my process of colouring, the negatives placed for a minute in the toning bath, and those which have been several hours in the colouring bath, remain exactly alike; if we employ the same collodion, the same baths, and allow the same exposure, all the negatives obtained successively from the same model, will be *identical in vig ur*, which is valuable in obtaining a photographic panorama, where the proofs rarely match.

"This advantage is no less valuable for portraits, for every one knows that on the just appreciation of strengthening in the ordinary processes, depends the good or bad results of toning positives."

M. Cassan has replied to Mr. Humbert de Molard's remarks upon his method of colouring negatives, to the effect that he could produce the same effect by coloured varnish. This, M. Cassan urges, would tinge without distinction the lights and shades of the negative, and defeat M. Cassan's invention, by rendering the negative altogether more opaque, and therefore requiring longer time to print; an effect that may be obtained without varnish by simply exposing the positives to a very feeble light, or by placing a sheet or two of paper on the frame during the printing. By M. Cassan's process the yellow colour of the chromes are more or less intense, according to the gradation of the negative picture, but the yellow colour is *nil* in the transparent parts of a good negative.

TRANSPARENT POSITIVES FOR THE STEREOSCOPE.

BY H. DE LA BLANCHERE.

In making negatives which are to be employed in producing transparent proofs, either for the stereoscope or magic lanthorn, we should never for a moment lose sight of the fact that they must possess special qualities. In the first place, the plate upon which the negative is taken must be perfectly plane and with parallel surfaces, and as thin, consistent with strength, as possible. In the second place, the negative picture must be sharp and distinct, conditions which absolutely exclude every kind of fogging.

This applies to every class of negative from which we desire to obtain a glass positive, &c.; but if we desire to obtain transparent stereoscopic pictures, the negative must be submitted to the following preparation:—

Let us suppose the negative to be completely varnished, we place it, collodion side downwards, upon a quire of blotting paper, then with a diamond we make a mark just midway in its length, and at right angles to it, thereby separating the pictures into two equal parts. Then starting from this central line, we measure four centimètres to the right and to the left, and with a square make two fresh incisions with the diamond, on each side parallel to the central line of separation. This operation requires great care.

It may happen that the division between the two negative pictures does not remain a line, but becomes a space of variable breadth; this is often the case when we measure only four centimètres to the right and the left of the line of separation. Besides, this space is no worse, but sometimes better, than a simple line.

These incisions being well made, we separate the negative, at first into two pieces, and secondly each piece into two, the extremities of which are thrown away as useless.

The succeeding operation consists in selecting a positive printing frame of suitable size, the glass of which is perfectly flat. Upon this glass we place the two stereoscopic negative pictures, side by side, collodion upwards, but *turned*, that is to say, the two sides which were contiguous in the middle of the uncut negative, now form the free extremities of the two proofs. The lower side rests against the lower edge of the positive frame.

Next we place upon these two negatives a plate previously covered with a dry coating of collodion, sensitized, so that the film that is to receive the picture is in perfect contact with that which touches it. This glass plate must be neither longer nor wider than the two stereoscopic portions in contact. We close the shutter of the frame, and the springs which are placed on its inner surface will, by their elasticity, maintain the three pieces of glass perfectly in contact with each other, and form, so to speak, only a single mass.

The frame is then placed in the light; it must not be placed in the direct rays of the sun, but preferably in a room opposite a door or window, through which the light will arrive subdued, without being obstructed by any object which, would be depicted upon the proofs. In such conditions, an exposure of one second is quite sufficient, and in fine weather even too much.

In uncovering the frame, care must be taken that its border does not throw a shadow upon the pictures, else it will be printed upon the transparent positive.

As we have stated, an exposure of one second is much too great, and even that of opening and closing the shutter as quickly as possible may also be too much. In that case, we close the window and operate in the room by diffused light.

In the development of transparent positives upon dry collodion, it is preferable not to carry them to their full intensity before fixing, but to proceed in the same way as with wet collodion, that is to say, develop the picture until it is perfect in all its details, perfectly free from fog or veil of every kind, but not possessing the requisite intensity. At this point we wash the film, and fix it with cyanide of

potassium, which is better for this purpose than hyposulphite of soda, because it is much easier removed by washing.

The picture may be developed as quickly as by the wet process, the best solution is—

Saturated solution of bicarbonate of soda	18 grains
Pure water	4 drachms.
Solution of pyrogallic acid (3 grains per 100 of alcohol)	6 drops.

Mix intimately together before covering the plate with it. The critical point is, that the film be perfectly moistened before the developing solution is poured over it. When all the details have come out, wash it carefully and cover it with the usual developing solution :—

Water...	25 grains
Pyrogallic acid	1 grain
Crystallizable acetic acid	3·50 grains,

with which the plate is covered for a few seconds before adding some drops of the 4 per 100 silver solution. Under the influence of this treatment, the intensity gradually increases; but lest fogging should take place, the development must be carried no further than the point at which the shadows become sufficiently intense. If the least tendency to fogging is apparent on the image, it must be washed to arrest the development, and be strengthened afterwards.

One of the special peculiarities of these kind of proofs is, that they can be obtained by artificial light. It is only necessary to put a piece of phosphorus, of the size of a pea, upon a brick or tile, and inflame it in the right position at the right moment.*

The time during which the combustion of the phosphorus continues is sufficient to print the plate previously placed in the positive frame. Care must be taken that no current of air prevails near the phosphorus in combustion, for the smoke may cover the plate, and obscuring the light like a cloud, prevent the printing.

To mount the transparent positive pictures for the stereoscope or magic lanthorn, cover the film containiug the picture with a piece of very thin glass; this is much preferable to varnish, which has the bad effect of rendering the film thick and opaque like.

Between the two glasses a piece of paper blackened on both sides is introduced. In this paper, an oval, square, or rectangular aperture is cut out and removed, leaving a black margin around the picture, which appears more brilliant by the effect of contrast.

Behind the glass which carries the picture a second glass, with ground surface, is placed, to render the picture translucent; or the ground glass may be replaced by coloured paper, so as to give the aspect of moonlight, &c., to a view. This series of glasses is easily kept together by means of a piece of ribbon glued upon the edges, uniting them all together.

If only two glasses are employed, one of which is the ground glass, we then place the film of the picture between the two, and the positives must be obtained in the camera, otherwise the images will be reversed, and contrary to what they are naturally.

Correspondence.

FOREIGN SCIENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

Paris, 21st Dec., 1864.

The last meeting of our Photographic Society was not distinguished by the presentation of any remarkable novelty, although the subjects introduced were of the usual number. A communication from the Dublin Photographic Society was read. It expressed a hope that many of our members would send proofs of all kinds to their Exhibition of the coming year.

M. Mathieu Plessy, presented some coloured photographs, displaying a very artistic aspect, and explained the method by which they were produced, the details of which must be reserved for a special communication.

Mr. Marion informed the meeting that he had made further improvements in his "preservative portfolio," and without increasing its cost.

Mr. Roch exhibited an enlarging apparatus, which, although apparently very complicated in its construction, gave very excellent pictures. It combines a reflector, a condenser, and a heliostatic movement; but does not exhibit any evident superiority over Dr. Van Monckhoven's instrument.

M. Humbert de Molard referred to the well-known method of obtaining reserves upon photographic positives by means of screens coloured with anti-photogenic colours. The originality in this communication consists in the employment of thick collodioned plates, tinged with aniline colours, &c. These screens have a very pleasing aspect to the eye, and the inventor assures us that their preparation is a very simple affair.

M. Placet, without pretending to introduce a new process, exhibited some heliographic plates obtained by printing by the usual photographic process, upon metallic plates instead of glass plates. The metal thus impressed with a picture is quite ready to print from. Further details must be reserved for another occasion, meanwhile, we may state that the method gives very excellent results. This chemist also exhibited some positive proofs, taken by means of the magnesium light, which were perfectly satisfactory in the shadows.

M. de la Blanchère communicates the following formulæ for the employment of cadmium salts in photography.

The bromo-iodide must be prepared with :—

Iodide of cadmium	3 drachms
Bromide of cadmium	1 do.

Aqua ammonia in sufficient quantity to effect solution.

Formula for the collodion :—

Gun cotton	40 grains
Bromo-iodide of cadmium ...	6 „
Alcohol	5 ounces
Ether	5 „

A little iodine is added to give the solution a pale straw colour.

The silver bath, which must not exceed a strength of 12 per 100, is acidulated with 1 per cent. of nitric acid.

The developer may be either formic acid or sulphate of iron.

At a recent meeting of the Academy of Sciences, General Morin presented, in the name of M. Laussédat, a report upon the application of photography to surveying, accompanied with a magnificent topographical plan of the environs of Grenoble. This work, which embraces an extent of surface exceeding twenty square *kilometres* (12½ miles), was executed in sixty hours, by means of twenty-nine photographic views, taken from fifteen different stations.

Photography in natural colours! Our hopes in this desideratum have slumbered so long as to appear well nigh defunct; and hitherto, when revived, only led to bitter disappointment. But, again, the glad tidings that will rouse the curiosity and perhaps excite fresh hopes, come to us from a most remote quarter, to which the photographic world has not hitherto thought of turning its inquiring gaze. In the *Cernéan*, a newspaper published at Port Louis, in the Island of Mauritius, we read the following announcement :—

"Photography has entered upon a new and unhoped-for path, and Mauritius enjoys the honours of this progress—thanks to M. Chambay, a true adept in photographic processes, who has resided many years amongst us, and obtained great celebrity for his views and other productions.

* The magnesium light is preferable now that the cost is reduced.

"M. Chambay has succeeded in fixing the colours of the object; the picture is taken instantaneously, as in other kinds of photography; the modelling and relief are marvellous; the blood appears to circulate beneath the skin; the colour is fixed; and the portraits, which present a surprising resemblance, are equal to the finest pastels, miniature, or water-colour drawings. M. Chambay is about removing to Paris, where he will certainly create a revolution, not in the political, but in the photographic world."

We must take the announcement for what it is worth, and patiently await M. Chambay's arrival, suspending opinion or judgment until that happy day dawns. The sun at the Mauritius is more potent than at Paris, and may achieve greater wonders. To make any real progress in solving this great problem of the fixing of colours, the photographer requires long days of uninterrupted sunshine, and the ability to bestow much time and money in costly experiments. These two essential conditions have this year failed our worthy friend M. Niepce de Saint Victor. The weather, taken generally, has been so bad that he has really been able to operate with sufficient light only two or three times, and as he has reached the limit of the three years' term of the Tremont prize, awarded to him by the Academy of Sciences, he has been compelled to reduce the expenses of his laboratory in the Louvre. But notwithstanding these impediments, he has, made a considerable stride in the path which he has followed with so much perseverance and ability. We had the opportunity last week of admiring a series of binocular and stereoscopic views, taken from dressed and ornamented dolls, in which the colours were fixed with a degree of truth and intensity quite novel to us. The reds, yellows, greens, and blues strike the eye by their vivacity, and this time they are accompanied by whites and blacks almost pure. To fix these colours M. Niepce is compelled to have recourse to high temperature; now heat weakens the tints imprinted by light, and modifies them by the red hue which it invariably commmunicates to the chlorided plate. When they come out of the camera, the whites and blacks are pure in colour, and truly admirable; but they become tarnished in the process of fixing by heat. This impression of the blacks is very surprising, and we do not know to what species of radiation to attribute it.

M. de Blocqueville, a young Frenchman, was fortunate enough to get himself attached, in the capacity of photographer, to the army sent by the Shah of Persia against the rebels of independent Turkistan. The rebels were victorious, and the unlucky photographer was made prisoner on the field of battle, and conveyed into the interior of the country. He has resided for several years in these territories, so little known to Europeans, and which will remain for many years more inaccessible than ever. Through the intercession of Marshal Vaillant, and the aid of the French Government, M. de Blocqueville has obtained his liberty. During the leisure afforded by his captivity, he has profited by the opportunity to add to the collection of photographs of ancient monuments, which he had taken before his capture, a map of Turkistan, together with drawings and text descriptive of the climate and manners of the people, a summary of which, by M. Dumas, will appear in the *Comptes Rendus of the Académie.*

M. Gaudin has the following communication on the employment of the magnesium light in the last number of *La Lumière*:—

For some weeks past I have had occasion to burn magnesium a great many times, and to reflect upon its direct application to photography. The result at first was to obtain an exact method of taking transparent pictures on dry collodion, by burning a given length of wire at a determinate distance. But I saw at once an excellent means of giving more relief to portraits during the present foggy season. This idea occurred to me while examining, by series, a collection of portraits by a celebrated photographer. These portraits are flat and without any relief, they dwindle down to silhouettes of a uniform grey, in which it is difficult to make out any resemblance. Upon comparing them with a portrait given to me by M. Bertrand, the brilliancy of the latter made the others look like faded proofs. The difference was owing to the first having neither white nor black, nor modelling produced by arrangement of the lighting, nor strengthening by toning, &c.; but the least lineament of white upon the salient points would have produced the necessary relief at once.

The production of portraits by artificial light alone presents great difficulties, so much so, that it is confined to profiles, because the effect of the light upon the eyes produces the well-known grimace. I have already pointed out, on several occasions, the interposition of blue glasses both before and behind the artificial illuminating point, with the employment of a vast reflector of elliptical curvature; but there still remains the precaution to be taken of a preliminary general lighting, sufficiently intense to keep open the pupil of the eye to its usual size in daylight, and nothing is better adapted to produce this effect than daylight itself. It will, then, be better to employ the magnesium light as an auxilliary to daylight during bad weather.

The combustion of this metal is so vivid, that the eye cannot endure it for a moment, without being hurt; but we may obtain good portraits without the patient having occasion to receive the artificial light full in the eyes; then, by burning the magnesium for about ten seconds, on one side the face only, with the precaution of screening the objective, by placing the light on the farthest side of it, a remarkable increase of modelling will always result, which blends perfectly with the daylight, and reduces the time of exposure one-half.

There is every reason to believe that lighting by magnesium will find innumerable applications, leading to its manufacture on a large scale, and quickly lower its price probably to a guinea the pound.

URANIUM AND ITS NITRATE.

SIR,—In your number for December 16th, p. 604, you publish Mr. Cooper's paper, "On Printing with Salts of Uranium," which was read at a meeting of the London Photographic Society, December 6th. At p. 606 a note is appended, and in it Mr. Cooper states:—"When caustic alkali is added to a solution of nitrate of sesquioxide of uranium ($U_2 O_3 NO_5 + 6$ HO), a yellow precipitate of hydrated oxide falls, which retains, however, a portion of the precipitant. But when ammonia is added to a solution of nitrate of *per*oxide of uranium ($U_2 O_2$) O_2, $NO_5 + 6$ HO, the salt used for the Wothlytype, and known as nitrate of uranium, a uranate of ammonia is thrown down, and if this precipitate is washed and heated to redness, to drive off the ammonia, the peroxide will remain."

On what chemical authority does Mr. Cooper give the formula of "nitrate of *per*oxide of uranium" as being ($U_2 O_2$) O_2, $NO_5 + 6$ HO, and as being the composition of the salt "known as nitrate of uranium?" and on what authority—chemical or otherwise—does he give it, as being the composition of "the salt used for the Wothlytype?" Notwithstanding former discrepancies of opinion, chemists now universally agree that, uranium forms a protoxide U O, and a sesquioxide $U_2 O_3$, and that it has two intermediate states of oxidation, viz., a black oxide $U_4 O_5$, and a green oxide $U_3 O_4$. These intermediate states of oxidation are not considered as specific oxides, but as being *mixtures* of the proto- and sesqui-oxides; thus, the black oxide is considered to be, two atoms of protoxide and one of sesquioxide, 2 U O, + $U_2 O_3$ forming $U_4 O_5$; and the green oxide is considered to be, one atom of protoxide and one of sesquioxide, U O, + $U_2 O_3$ forming $U_3 O_4$. There are also generally recognised two other compounds of uranium and oxygen, which are *sub*-oxides, viz., $U_2 O$, and $U_3 O_2$; these suboxides are very unstable, and, whether in solution or not, will rapidly pass into a higher state of oxidation, if left in

the air. *These comprise all the known uranic oxides.* Now, the oxygen in these six oxides, stands in the following ratios to each atom of uranium:—

In the Oxide		Grains of Oxygen		Grains of Uranium.
$U_2 O$	there are	4	to every	60
$U_3 O_2$	„	$5\frac{1}{3}$	„	60
$U O$	„	8	„	60
$U_4 O_5$	„	10	„	60
$U_3 O_4$	„	$10\frac{2}{3}$	„	60
$U_2 O_3$	„	12	„	60

By this table we see very plainly that the sesquioxide $U_2 O_3$ is the highest state of oxidation, and, therefore, the *sesqui* oxide is, in fact, the *per*-oxide; and consequently, in manuals of chemistry it is usually designated the "per or sesqui-oxide of uranium.

It happens that no mixture of these oxides will give Mr. Cooper's peroxide $(U_2 O_2) O_2 = U_2 O_4$; and even if they would, it is reasonable to suppose that such compound oxide would be resolved into its specific separate oxides by the action of acids, the same as the other mixed oxides of uranium are, and, therefore, that it would not form any salts.

The *sesqui-oxide* of uranium requires but one atom of acid to form a salt, instead of three, as required by other sesquioxides; this is exemplified in its nitrate $U_2 O_3$, $N O_5 + 6 H O$; salts are therefore formed by it, in the same manner as they are formed by *pro*toxides of other metals. This anomaly is accounted for upon the hypothesis that a uranic *radical* exists, which performs the functions of a simple metal in the formation of salts. This radical is named *uranyl*, its composition being two atoms of uranium and two of oxygen; thus the sesqui-oxide of uranium $U_2 O_3$, becomes the protoxide of uranyl. According to this hypothesis, the salt which is commonly called the "nitrate of the sesquioxide of uranium," having the anomalous formula $U_2 O_3 N O_5 + 6 H O$, becomes the *proto-nitrate of uranyl*, having the usual protoxide formula $(U_2 O_2) O, N O_5 + 6 H O$; the protoxide of uranyl, like all other protoxides, requiring, of course, but one equivalent of acid to form a neutral salt. This idea of the existence of a radical receives confirmation in the composition of other compounds of uranium; the acetate being $(U_2 O_2) O, C_4 H_2 O_3 + 2 H O$; the sulphide $(U_2 O_2) O S + H O$; and the carbonate—as existing in the double carbonates of uranium and ammonium, of uranium and potassium, and of uranium and sodium—being $(U_2 O_2) O, C O_2$; however, it would take up too much of your space to enter more fully upon this subject. According to the hypothesis of a radical *uranyl* $(U_2 O_2)$, Mr. Cooper's *per*-oxide of *uranium* $(U_2 O_2) O_2$ becomes a *bin*-oxide of *uranyl*; and, in fact, is thus formulated by him in $(U_2 O_2) O_2, N O_5 + 6 H O$. Now, this formula presents a stranger anomaly than that does, which represents what is commonly called "nitrate of sesquioxide of uranium," for we have a binoxide with one atom of acid. If this be *really* the composition of the uranium salt "used in the Wothlytype," which, with all due deference to Mr. Cooper, *I very much doubt*, it must be confessed that there is great novelty in the process, inasmuch as a hitherto unknown nitrate is employed; and the patentee can, therefore, most assuredly claim the introduction of "*a new salt*, albeit, it be but a single one.

Respecting $(U_2 O_2) O_2, N O_5 + 6 H O$, being, according to Mr. Cooper, the composition of the salt *known as nitrate of uranium*, I can only say that I have purchased, at various times and places during the last three years, the salt called and known as such, and *invariably* what has been sold to me—even during the present week—has been said to be a "nitrate of the *sesqui-oxide* of uranium, viz., $U_2 O_3, N O_5 + 6 H O$. When I first read Mr. Cooper's note, I felt inclined to attribute the figure 2 which accompanies the O, outside the brackets, as being an inadvertent addition of the printer, that had escaped correction, but it occurs also in your contemporary, the *British Journal*; moreover, taking it away would only render the composition of the "nitrate of sesqui-oxide of uranium" the same as that of the so-called "nitrate of *per*-oxide of uranium," although formulated differently. Thus—the formula $U_2 O_3, N O_5 + 6 H O$ represents a "nitrate of the per or sesqui oxide of uranium," and the formula $(U_2 O_2) O, N O_5 + 6 H O$ represents a "proto-nitrate of uranyl;" these two nitrates being in fact *the same salt under different names.*

Mentioning your contemporary, reminds me that there is a truly ludicrous blunder at p. 505 of the number for December 9th. In their report of the discussion which ensued upon the reading of Mr. Cooper's paper, Mr. Williams is said to have informed his hearers that "*salts* of the uranic oxide" were not "*oxides*, as Mr. Cooper seemed to think," but "were *salts* of the uranic oxide." Mr. Cooper is said to have "admitted the force of this remark," that is, acknowledged its truth. Methinks he could not possibly do otherwise; but—although not present—I am very sure that he never said what the report leads us to infer, viz., that salts *being salts, and not oxides*, "might account for some phenomena he had observed, but for which he had hitherto been unable to account." Having previously read your lucid report, I laughed so heartily at your contemporary's exposition of the remarks made by Mr. Williams, that I actually made my side ache; and even now cachinnating, I subscribe myself, yours truly, George Price.

18, *Mornington Road, New Cross Road, Deptford.*

[The blunder referred to is most probably one of the printer. We have bitter knowledge of the foolish errors in science, which writers in periodicals where there is much haste and little time for revision, are made to commit by the carelessness of the printers.]

Talk in the Studio.

"The Art Student."—This interesting serial has just completed its first volume. Mr. Wall announces that in the forthcoming year various improvements will be made, especially in the material form of the magazine. An increased number of pages, larger type, &c., will form important items in these improvements, and the price will be in future one shilling monthly. We think Mr. Wall has taken a wise step in making these alterations, and hope for the next year's issue a full share of success.

Alleged Infringement of Copyright.—The suit "Lloyds against Ashfords" (in which application was about to be made for a Chancery injunction to restrain defendants from publishing photographic cartes of "Mighty Onconvanient," and its fellow picture), has been again deferred, and at the instance of the same parties who applied for a former delay, the plaintiffs themselves.

Photographic Fiction.—The editor of the *Photographic Notes* announces, as a feature of his journal during the forthcoming year, a serial tale, to be entitled, "The Photographers," in which, in addition to plot, incident, character, and description, the sayings and doings of photographers, male and female, will be introduced. The tale is by "An Old Cantab." Is Mr. Sutton himself the "Old Cantab?" We should not wonder.

The Dublin International Exhibition.—We beg to remind our readers that all applications for space ought to be made before the close of this year. An interesting paper in connection with this exhibition was read on Wednesday evening week at the Society of Arts, Lord Dufferin, K.C.B., in the chair, on the "Progress of Irish Industry, and the Dublin International Exhibition of 1865," by Sir. R. Kane, F.R.S. The paper pointed out the advance that had been made in various Irish manufactures and industries during the past ten years, and gave a detail of the steps that had been taken towards the establishment of the second great International Exhibition in Ireland, to be opened in May next year. It was shown that a very good representation would be made, not only of Irish manufactures, but of the best specimens of the

art and industry of all the leading States of Europe, as well as of India, and of many of the principal British colonies. The hearty co-operation of British artists and manufacturers was invited, in order that all the credit might not fall to foreign exhibitors. At the close of the paper a discussion ensued, in which Lord Powerscourt, Mr. Chichester Fortescue, Mr. H. Cole, C.B., Mr. Hawes, the Chairman of the Council, and other gentlemen took part. In response to an appeal from the Chairman, Mr. Hercules Maedonnell and Mr. Antonio Brady gave an account of the cordial reception and enthusiastic promises of support they had received in those countries of the continent which they had visited on behalf of the Exhibition.

ROBBERY BY PHOTOGRAPHIC PRINTERS.—On Tuesday at the Mansion House, William Claxton and William Gambier, 19 and 16 years of age, and described as photographic printers, were brought before the Lord Mayor, charged with breaking and entering a dwelling house. The prisoner Claxton was also accused of robbery. After detailing their further proceedings, witness stated that he went with another constable and searched the prisoners lodgings. There he found 235 stereoscopic slides, a book containing sketches, upwards of 300 copies of stereoscopic scenes, and eight gauges. The prisoner Claxton, on being asked how he accounted for their possession, replied that they were all his own, and that he had printed them himself. Mr. Alfred Pursel, of 121, Cheapside, said within the last six weeks he had been missing money. He had lost about £50. The upper part of the house was occupied by Mr. Fox, a photographer, who had a key of the outer door, and Mr. Willis. Mr. Edmund Fox, photographer and photographic mounter, deposed that he occupied the first and fourth floors over Mr. Pursell's shop, and had the street door key. The prisoner Claxton, who had been in his service for six years, had the charge of that key and others. Gambier was also in his employment. Neither of them had any occasion to be there on a Sunday. Witness identified as his property the 235 stereoscopic slides, the 300 stereoscopic scenes, and the eight gauges. The slides must have been taken from his premises in Little Britain about twelve months ago, where both prisoners were at work, as must also the guages. The sketches he believed were not his. The value of the whole was about £13. The prisoners were committed for trial.

To Correspondents.

S. W. B.—Neither of the samples of glass you forwarded are really well suited for a dark room, especially if the window have an aspect where direct sunlight is admitted. One of them is a light yellow; the other, although darker, is only a yellowish brown, not an orange, which is required.

KENT.—The general plan of your glass house will answer, but it will bear some improvement in detail. We prefer the ridge roof, but it should not be less than 8 feet or 8 feet 6 inches in length at the eaves. We should prefer more than 8 feet of glass, and the glazed part at the side, a little less sloped. Further experience has shown that the anticipated advantages from working in that direction have not been gained.

JOHN OXFORD.—The lighting of the portrait you forwarded is not bad, but the negative is a little over-intensified. In making blinds for your roof, let them be in a series of strips or somewhat narrow blinds, which will enable you to shut out the light by degrees, and thus secure various effects. Then read our recent article on experiments in lighting, and follow the instructions there given.

MOST OBLIGED SERVANT.—You will find full instructions for the recovery of silver and gold from waste solutions and other residues in our last YEAR-BOOK, and also some information on the subject in that now in the press. The cost of the carbonates of soda and potash used in the flux is very insignificant, never exceeding a few pence in recovering as may shillings-worth of metal. Mr. F. W. Hart has recently invented an apparatus which serves as a save-all for silver.

IGNORAMUS.—Take your negatives, and after first moistening the film cover it with a solution of iodine 1 grain, iodide of potassium 2 grains, in water one ounce. After this has remained on the film a few minutes in daylight, wash it off and apply the ordinary solution of pyro and silver. This will generally give sufficient intensity at once; but if necessary you may again apply the iodine solution and then the pyro and silver. It will be as well to varnish the edges of the plates to preserve the film. 2. There are various formulæ for iodized paper for enlargements. We have seen excellent prints produced from a formula, in which 8 grains of iodide of potassium, 6 grains of bromide of potassium, and 3 grains of chloride of ammonium were dissolved in an ounce of water. This is the iodizing solution of Mr. W. Woodbury, complete details of whose process will appear in our forthcoming YEAR-BOOK.

TROUBLED WITH SUN.—It is important that you should have a side-light at the east, but if that be impossible, you will have to be content to make shift somewhat. When the sun shines into the room from the west window, stop it out with the thinnest material, which will stop the direct rays, such as tracing linen or tissue paper. 2. By all means have the skylight continued to the eaves on both sides, that will give you a great advantage. 3. Whenever direct sunlight enters a room, deal with it as we have described. Mr. Blanchard recently wrote an article on the subject of lighting in our pages; from this, and from an article on the adaptation of conservatories to photographic purposes in our last volume, by the same gentleman, you will gain some valuable hints. 4. Probably twice as quick.

HENRY REED.—The *liquor ammoniæ* of the chemist will answer the purpose. The time of fuming depends on circumstances. See article on the subject in our last. It is not necessary to use nitric acid in the silver bath. If it be used the fuming must be continued longer.

R. A. REEKS.—We regret that we do not know of one whom we can recommend.

SAM. CORRIGAN.—Thanks for your letter. We shall be glad to see the specimens. We shall endeavour to comply with your wishes.

WALTER NOEL HARTLEY.—Thanks for the communication, which is safely to hand, and shall appear shortly.

GOLD BEETLE.—We do not quite understand the condition of surface to which you refer. Albumenized paper, which is very dry and horny, is apt to repel solutions at times, and the water will run from it as if they were greasy if they have been much handled. Send us an example. The toning solution referred to may be used with the ordinary printing process.

G. R. B.—There is no work on photolithography except that of Col. James, published by Longmans, at 12s. 6d. The principal information on the subject is to be found in our columns in various articles by photolithographers. 2. To copy a card the exact size of the original you require a camera which will extend to double the equivalent focal length of the lens. If you use a No. I triple, which will answer well, the camera must extend to 16 inches. If a good ¼-plate, portrait lens stopped down, the camera should extend about 13 inches.

G. S. PENNY.—Thanks. We will write shortly.

F. S. BEATTY.—The reproductions of Herr Schauer are by photography, not by photolithography. We shall have pleasure in showing such examples as we have to a gentleman calling upon us. The lens to which you refer was described in our number for October 23, 1863.

W. G. TWEENY.—Thanks for communication just to hand, which shall appear in due course.

B. P. N.—Collodion containing uranium and silver will not yield an image on glass, unless the glass first receive a coating of some organic matter, or some such substance be added to the collodion. The suggestion to which you refer as to the use of collodion so prepared, for transparencies, had been made in forgetfulness of the fact that the presence of organic matter is necessary to effect the necessary decomposition to produce an image.

ORNAMENTAL BORDERS TO PHOTOGRAPHS.—Mr. E. Brooks calls our attention to an error in his letter, published a fortnight ago. It should have said that, the designs being registered, would be a bar to piracy. He states also that he finds such borders please the public. Well, pleasing the public is one important object of the professional portraitist, and he is right, therefore, in persevering with them.

G. P. F.—The depth of the convexity must be proportioned to the size of the disc very carefully, in order to secure the due effect of relief. If the disc be larger it will require more convexity to get the same effect of relief. The gentleman to whom you refer was speaking literally without the card. If he had examined the same pictures before and after receiving the convexity, he would have discovered his error. There is no barrier to your giving a convex form to one or any number of images, arranged in any form except that which is registered. The convexity is as you conjecture, similar to that of enamelled miniatures.

SILICA.—We have not had much experience in the use of silicate, and such as we have had has not impressed us favourably, leaving us in great doubt of its value as a protecting agent. The super-silicate is the most simple and easy to use, simply having to be applied with a clean brush like a varnish.

W. NOTMAN, Montreal.—The stereographs and book of American scenery duly received, and shall be noticed shortly.

INSTANTANEOUS CARDS.—We have received, without any note, a packet of card-pictures bearing the name of Mr. Plumtree, of Louth. They consist of portraits of children, horses, &c., some of which are very charming. They are produced by the aid of Ross' card-lenses, No. 1 and 3.

We are obliged to defer several communications for lack of space.

Several correspondents in our next.

Photographs Registered during the Past Week.

Mr. J. H. KAY, 57, Argyle Street, Glasgow.
One Photograph of the Rev. Robert Stewart, Glasgow.
One Photograph of the Rev, M'Millan, Glasgow.

Mr. ALEXANDER GREEN, 136, Buchanan Street, Glasgow.
Two Photographs of the Rev. Walter Morrison.

Mr. W. FOX, Sandbach.
Five Photographs of Mrs. Theobald, Temperance Orator.
Two Photographs of the Rev. C. F. Bagshawe, Chaplain at the Old Bailey, Manchester.

Mr. WILLIAM SPANTON, 16, Abbeygate Street, Bury St. Edmonds.
Five Photographs of Mayor Parker, M.P. for West Suffolk.

Mr. GEGAGE J. TEAR, 6, Upper Dorset Place, Clapham Road, S.
One Photograph of the Rev. R. H. Lloyd, Chaplain to the Archbishop of Canterbury.
Diamond Design for Mounting Photographs.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to THOMAS PIPER, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

THE PHOTOGRAPHIC NEWS.

VOL. VIII. No. 330.—*December* 30, 1864.

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THE MAGNESIUM LIGHT IN PORTRAITURE.

WE have repeatedly stated that we see no probability, and certainly no necessity, for the light from magnesium or any other artificial source becoming generally available for night portraiture. Without wresting sacred words from their original meaning, the injunction may be especially offered to photographers, "Work, therefore, while it is day, for the night cometh when no man can work." However perfectly actinic the light, however cheap its source, portraiture by artificial light can never be generally successful, from the discomfort in which it must place ninety-nine out of every hundred sitters. A concentrated light sufficiently intense to illuminate a sitter, and yield a portrait in a reasonable sitting, placed within a few feet of the sitter's eyes, must always tend to produce such a contraction of the facial muscles as will be rendered in the picture by a malignant scowl. Night portraiture, therefore, notwithstanding the admirable examples of what is possible, produced by Mr. Brothers, is, for general purposes, clearly out of the pale of things probable or desirable.

There are cases, however, in which night portraiture may be necessary to secure a portrait at all. There may be, and probably are many more cases in which the magnesium light may be the valuable auxiliary to dull daylight. In the apartment of the sick or dead, where satisfactory illumination by daylight is impossible; or in some scene where desirable or necessary accessories, impossible to be moved, are placed; even in the photographer's own studio, when the light is poor and dull, the new source of actinism may be made a valuable adjunct. Twenty grains of the wire, whether round or flattened into a tape, whether burnt in a single wire, or twisted, plaited, or bound, so as to form a miniature torch, Mr. Brothers informs us, is sufficient with a good lens, good bromo-iodized collodion, and iron development, to yield a good negative. The amount of light may be practically weighed, and at night exposure will cease to be guess work. With a dull daylight then, which the photographer estimates will give him a poor tame negative in sixty seconds, he may, by burning ten grains of magnesium wire in a position to illuminate the model well, reduce the sitting to thirty seconds, and probably obtain a more brilliant negative. Some of the negatives forwarded by Mr. Brothers and by Mr. Grant, satisfactorily prove this, possessing an amount of force not usually seen in pictures obtained in foggy or dull weather.

This then is an application of the magnesium wire well worthy of the photographer upon whose efforts the sun shines but feebly. The mode of using the light becomes next a question of general importance. The useful hints recently given by Mr. Brothers should be studied carefully: but we think that if the light were in frequent use, some more specific arrangements might be adopted. Mr. F. W. Hart, in exhibiting his lamp for burning this wire at a recent meeting of the North London Association, called attention to some contrivances well worthy of attention. A very simply improvised reflector attached to the small hand-lamp was useful, and free from the inconveniences of a reflector of metal or glass. It consisted simply of a very shallow cone of white cardboard similar to those used over the globe of a reading lamp. This throws the light in a given direction, without reflecting images of the flame, and is at the same time cheap and easily renewed. Moveable wings lined with white, hinged to the background, he suggested, were valuable as reflecting the light on to the sitter in any direction. Between the camera and the sitter was placed a screen, with an oval aperture; this screen, by its position and the size of the aperture, might either permit the whole of the figure to be taken, or might be made to vignette the picture. To the lower portion of this screen, descending in an inclined plane towards the sitter, was another surface of white, intended to reflect light upon the lower part of the figure. Thus, by reflecting surfaces of white calico, as much of the light as possible was utilized. In using a multitude of reflecting surfaces, consideration should of course be given to their effect in the picture, as false reflections might produce a worse effect than absence of light, but still those appliances afford suggestions of what is possible, which may be worthy of the attention of our readers.

NEGLECTED ART-FIELDS FOR PHOTOGRAPHERS.

BY W. WARWICK KING.*

PHOTOGRAPHERS, it must be admitted, following the generality of Englishmen, exhibit a tendency to keep in one groove. This remark especially applies to landscape photography. Take two examples. Tintern Abbey, and Kenilworth Castle. First Dr. Diamond led the van, with some beautiful calotypes of these places. He was followed by Mr. H. P. Robinson, Mr. Bedford, and Mr. S. Thompson, and if their productions were not enough, a host of others were attracted to the same spots, which I think must have seen the camera more often than any other places in England, numbers of prints were visible in the shop windows, and even our own Society could not escape the vortex, for it actually, on two occasions, selected prints of Tintern and Kenilworth, for distribution among

* Read at a meeting of the North London Photographic Association December 21st.

its own members, in fact, we feel that we could not say with the poet,

"Oft for some old familiar strain,
Untired we ask and ask again,
Ever in its melodious store
Finding a spell unheard before."

but we were positively tired of the subjects, so frequently presented to our view, and are obliged to banish them from our portfolios.

That photographers are desirous of some novelty is evidenced by the new Diamond Cameo portraits of Messrs. Window and Bridge, and the various new methods of printing specially adapted for portraiture, but it seems to me that they do to a certain extent, treat other subjects with neglect, though they well deserve attention, as I hope to show. Without entering into the question of art in photography, all, except the ignorant critics in the *Athenæum*, will admit that its copying powers are unequalled. Hence I will consider one branch of art to which those powers ought to be applied.

The PHOTOGRAPHIC NEWS, No. 313, contains an admirable article on the reproduction of paintings and engravings, but this seems to have produced no fruit. We all are familiar with Schauer's photographs, and the numbers which block up the shop windows, attest their ready sale. They consist of copies from Fra Angelico, Fra Fillippo Lippi, Titian, Raffaelle, Holbein, Van Eyck, and Van Dyck, to say nothing of those from paintings by artists of the modern schools, and it really seems a reproach to Englishmen, that they should allow a German to be in the field before them, and almost exclusively to occupy it. The Editor of the PHOTOGRAPHIC NEWS says :—

"It is a fact that in this country we have no professional photographer whose name is solely associated with reproduction as a speciality—we except of course from this remark that of Mr. Thurston Thompson, who, however, as photographer to South Kensington Museum, scarcely comes within the category of professional photographers practising commercially. The admirable copies of Raffaelle's cartoons, Turner's pictures, &c., by that gentleman, and the copies of pictures by Mr. Annan for the Art Union of Glasgow, attest that the ability for such work is not wanting amongst our own photographers, and renders the inferior interest in, and the comparatively small practice of this branch the more remarkable."

The prices of original engravings of the early school are well known; the last copy of Albert Durer's S. Hubert sold for 48 guineas, his Melancholia, and other etchings, fetch large prices, the same may be said of those by Martin Schoen, Lucas Van Leyden, Rembrandt, and the later Italian school, such as Marc Antonio Raimondi, also those of English artists, such as Hollar, the engraver of the illustrations to Dugdale's "Old St. Paul's" of a most exquisite chalice, and Faithorne the cavalier engraver known by his etchings of Holbein and Van Dyck's portraits. Of the great value of these engravings to the student Mr. Ruskin is quite aware, for in his "Elements of Drawing" he speaks of the need of getting the works of Rembrandt and Durer, as being very useful in showing the effect which may be produced by lines, or dots, placed in the drawing with a purpose. No one can deny the interest which, on examination, will be found in the last named artist's works, far different from the works of modern artists in general, which are simply pretty, and may be soon passed by and forgotten. I quote some of Mr. Ruskin's observations :—

"You will find on copying that bit of Durer, that every one of his lines is firm, deliberate, and accurately descriptive, as far as it goes.

"And in course of doing this, you will find that not a line nor a dot of Durer's can be displaced without harm; that all add to the effect, and either express something, or illumine something, or relieve something. If, afterwards, you copy any of the pieces of modern tree drawing, of which so many rich examples are given constantly in our cheap illustrated periodicals (any of the Christmas numbers of last year's *Illustrated News* or *Times* are full of them), you will see that, though good and forcible general effect is produced, the lines are thrown in by thousands without special intention, and might just as well go one way as another, so only that there be enough of them to produce, all together, a well-shaped effect of intricacy; and you will find that a little careless scratching about with your pen will bring you very near the same result without an effort; but no scratching of pen, nor any fortunate chance, nor anything but downright skill and thought will imitate so much as one leaf of Durer's."

I have alluded to the reproduction of engravings by Herr Schauer. Now let us see who represents the reproduction of paintings in England, none;* but in France, Mr. Bingham, some of whose works, by the kindness of Messrs. A. Marion, Son, and Co., of Soho Square, I now lay on the table. He is indeed *facile princeps*. If he has succeeded so well, why do not others follow him? It cannot be said that there are no subjects open. We have a National Gallery which, by its additions in late years, bids fair to be worthy of the name; and a British Museum, which has a magnificent collection of early etchings and sketches by the great masters. I have said what Mr. Bingham has done, and now mention the name of M. Fierlants, of Brussels, and the Stereoscopic Company during the International Exhibition of 1862. This shows what can be done, and we may ask why there is no photographer ready to enter the field? It must be more attractive than the continual production of cartes de visite, and would doubtless be found sufficiently remunerative.

I will now pass on to the works of antiquity. First, Sculpture. On going through the galleries of the British Museum, one is astonished at the extent of the collection; yet what have we seen in the way of reproductions? We are familiar with the wretched cuts in the *Illustrated London News*, but they will not satisfy the art-student. Mr. Fenton paid some attention to these works, but his photographs always had the unfortunate liability to turn yellow and fade away, but his mantle seems to have fallen on no one else. Then, again, look at the wonderful collection in 1862 at the South Kensington Museum. Magnificent work in gold and silver, arms, armour, embroidery, and nearly every kind of mediæval art was there represented; some of it occasionally appears in other temporary collections, and yet how few were photographed, and even those sold at a price which put them quite beyond the reach of the ordinary art-student, who is not always supplied with a full purse.

During the month of September, in company with Mr. Henry Greenwood, I was enabled to visit the museum of Joseph Mayer, Esq., F.S.A., at Colquitt Street, Liverpool, we were in company with the late Mr. Glover, whose recent loss we have so much to deplore. I asked him why the photographers of Liverpool had not been at work in photographing the contents of this museum. There were Saxon remains, fibulæ and other ornaments, Roman ivories, and also those of the mediæval period, beautiful Wedgwood, and other rare porcelain, embroideries, MSS., and tapestries. He could not answer; yet there was scarcely an object unworthy of reproduction, many of them showing the exquisite taste possessed by our forefathers in the so-called dark ages.

The interiors of buildings have scarcely received the notice they deserve. It is true, that we occassionally see some magnificent specimens, such as those of the Ravenchurch chapel, in the church of St. Mary at Warwick, and Dean Sugar's Chantry in Wells Cathedral, also the stereoscopic views by Mr. Wilson, Mr. England, and Mr. Stephen Thompson, but there branch of photography cannot be said

* Since reading this paper, I have seen a list of photographs from the paintings of some of our best modern masters, published by Messrs. A. Marion, Son, and Co., so that the statement I made must be received with some qualifications.

to be generally pursued. Next we know that London is the resort of all nations; the study of Ethnology is pursued with increasing interest, and it might be much advanced if photographers would only lend their aid.

Geology has received but scanty notice, and yet how beautiful are photographs of the various changes which the earth has undergone, and full of interest to the artist and man of science, exhibiting nature in its wildest aspect, and often exquisite in scenery. The photographs of wild animals in our Zoological Gardens have only been recently attempted with marked success. I am aware that the Count de Montizon some years ago produced specimens, but Mr. Frank Haes has shown what can be done at the present day. These photographs are remunerative to the artist, and invaluable to the student, as showing us the animals themselves, instead of as they are imagined to be by the painter.

Although what I am now about to say may not fall strictly under the head of art, yet I am sure you will say it is closely akin to it—I mean the photographs of animals at agricultural shows. The common prints of these animals do not reveal their beauty of form to our minds as if correctly drawn. They are generally in the midst of some impossible scenery, and not as we saw them. How invaluable would good sized photographs of these objects be both to the farmer and the artist, and yet we in England do not notice them. They manage these things better in France, for some years ago I saw some beautiful photographs of animals exhibited at an agricultural show. The artist was the adventurous Nadar.

Dogs are also passed over, and yet few persons are to be found who would not gladly get photographs of these animals. The numbers visiting the Agricultural Hall during the annual dog shows show that the public would be glad to possess some faithful mementoes of the objects of their admiration. Should difficulties exist they could easily be overcome, for if Mr. Haes has been so successful with wild animals, we may easily suppose that tame ones would not present such obstacles.

If photographers will only take these hints, they will render the greatest service to art, by familiarising the public with the works of the older masters in painting and engraving; it will be led to despise such wretched specimens of art as "Frith's Derby Day" and the puerilities of Dobson. Their taste will be improved also in sculpture and metal work, for their gold and silver, with its imitation electro, exhibit designs almost unsurpassed in ugliness. The ethnologist will be aided in his study of the human race, and the student of Natural History receive true impressions of the objects of his pursuit; animal painters, too, will not draw animals as they never appear in nature, for the educated public eye will soon detect a fault.

I trust now that I have fulfilled the promise implied in the title of this paper, and that the observations I have presumed to make will not altogether be disregarded.

SEASONABLE JOTTINGS.

BY A PHOTOGRAPHER'S ASSISTANT.

Ding dong! Ding dong! No funeral dirge nor passing knell, but merry peals of metallic laughter, are borne on atmospheric waves along. The old year stoops, totters, palsied tremblings shake its frame, now grown so old, and soon poor '64 will pass away for ever. For ever! King Sol has hid his face. Dark clouds pursue their rapid course through space. The spirit of the wild storm ascends his icy throne, and bids the elements prepare for wintry warfare. The ground may be wrapped in whitened sheet, and trees turn their snow-laden branches towards the sky. The crystal stream become a motionless mass, more chill than death. But what matter. "Let winds blow on, and crack their cheeks." 'Tis Christmas-tide. The streets are thronged with joyous groups, shouts of merriment rend the air, and happiness would seem to reign supreme for ever; the ragged homeless beggar, tries hard to force a smile on his haggard famine-stricken countenance, in honour of the season that above all others applies the key to the sometimes long-locked door of sympathy. "Ding dong! Ding dong!" ring on merrily, for many a pang have ye shot through aching hearts of sorrow during the present fast fleeting year. "Ding dong!" Now something that may fan the flame of genius, or blow a puff of inspiration into our ink-bottle, we have a scene to paint. Ring on.

A COTTAGE.

The cheerful fire burns with ruddy glow, and holly bushes find a temporary resting spot where tallow candles once reigned supreme, brass candlesticks, dilapidated decanters, and tarnished picture frames, where the red berries blush their reddest at the absurdities therein belonging. "Sailor's return," "Soldiers farewell," and other touching scenes, lit up gems of gold and little dolls of silver. You cannot see them at this moment, because they lie concealed in bowers of evergreens, trimmed off with paper roses. The kettle sings its welcome song upon the hob. The cat's purring note as it counts the soft gentle stroking hand of that little child, renders not less audible the measured ticking of the old brass-clock, nor the unseasonable cry of Cuckoo, Cuckoo. Ding dong! Ding dong! Hush, your ringing voices pass unheard, unheeded, so absorbed is that mother as she gazes on the sun-tracing that represents the sailor boy. Many weary miles of rock-bound shore, raging seas, and wide-streatched ocean, seperate mother from her child. Yet in that sun-drawn picture he revisits home, and wishes all beneath the humble roof a merry Christmas. Oh, lucky morsel of paper? A mother's kisses moisten its surface, and she hugs it near her heart with tears of joy, declaring that picture to be a treasure more precious than all her earthly possessions. Who can count the many homes made more happy, during the present festive season, by the presence of the little C. D. V! How many a broken link is restored by its presence, without whose aid the separated ones were lost for ever! That aged parent, who last year presided with patriarchal grace at your board, has since passed away. His children, with his children's children, meet again. The chain is broken, but how speedily restored when that portrait (which by a pardonable plot was so timely secured) is passed around, the old man seems to smile anew, and hearty ha! ha! ha's! follow recitals of the sayings and doings of the deceased relative, that presided at their last Christmas meeting.

We love to work earnestly as the Christmas season approaches, and sometime we cannot avoid feeling more than usual interest in our charge, and oft-times detect ourselves, speculating on the probable destiny of the many inmates that inhabit *(pro tem)* the frames before us. There is a richly attired lady. She will be forwarded to noble mansions to be looked at when a convenient season arrives. A long line of ancestry with curled hair and bedizened wigs, by Van Dyke, Van Daub, and Van Nobody, are staring from richly-carved and gilt frames that demand immediate attention. Fine art, you know. If you are vain enough, stick to fine art. Don't for the world look on the photograph of an absent friend or brother. It may touch too nearly the selfish heart, you know. "Ugh! put it in the album, and shut it up."

In the next frame, the languid actinic ray is calling into existence the image of a young girl. Is it for a lover? perhaps for an absent brother (we love to think it so), and we mentally follow it across the sea, and on the lower deck of that man-of-war, whose usual gloom the magic wand of Christmas has dispelled; a young and active sailor drops a tear of affection over the little card that bears the well-remembered features of an only sister.

Next we have a "muling and puking infant." Oh, what joyous laughing eyes will peep at those tiny features. New-made uncles will glance suggestively at their sweethearts, and youthful aunts will fall to cooing, make-believe nursing, and real-believe kissing. No end of fine clothes

are mentally provided, and Christmas is here made more merry by the little picture visitor. And so we could continue with possibilities and probabilities enough to fill a Christmas annual, but we forbear.

A word or two in conclusion. Brethren, we suggest a resolution for the new-born year. Resolve that your light in future will be reflected from things suitable and more appropriate. Let not servant girls stand idly and ungracefully against pedestals in marble halls. (The wine cellar is always locked—don't you perceive?) Nor allow young ladies to wander by the seaside without bonnets; they may catch cold, notwithstanding your considerate kindness in providing a carpet for their tender feet. "Ideal." Nonsense! Study Nature: for he alone deserves the name of artist that knows how to entrap Nature in her happiest and most natural mood. We are done, kind readers; do not forget. We make a profound bow as we hope you are enjoying all the good we wish you at this festive period, when the sand of time has run its course, and '64 expires. *Au revoir!*

COPYRIGHT IN ENGRAVINGS.

A poor plodding art student, or lady amateur, might copy a popular engraving either for amusement, study, or to earn a crust, as the case might be, without inflicting much harm on the owner of the copyright. Beside, art-students are entitled to some favour at the hands of successful artists. The case, however, entirely alters when some expert, speculative, photographer, dishonestly seizes a novelty in the shape of a first-rate ten-guinea print, and, by a cheap process, reproduces it by thousands at the rate of a shilling a piece. This is often done. We have lately been shown a large and effective photographic copy of the fine engraving after Sir Edwin Landseer's picture of "The Maid and the Magpie," which was being hawked from door to door at the low figure of fourpence, after Messrs. Graves and Co. had paid a small fortune for the sole right of publishing the print. The same trick has recently been played with the print of Faed's popular picture of "The Mitherless Bairn." We hear, moreover, of a wealthy amateur professor of photography who recently took the portrait of a distinguished personage "just out," photographed it, and distributed copies among his friends, who were people who could afford to, and no doubt would have bought the original engraving but for the amateur's questionable generosity. If the law of copyright, as at present constituted, fails to reach these hawkers and photographers, amateur and other, the sooner it is made to do so the better. At this time the question of fine art copyright is again occupying the attention of eminent painters, engravers, and publishers. The interests of art and artists and the public are at stake. If the picture buyer and print publisher, properly so called, is long compelled to speculate without protection, the higher order of art must necessarily suffer in the end. When a capitalist of fine taste invests his money on painters and engravers of celebrity in order to produce a master-piece of art, surely no doubt ought to exist as to the rightful owner of a work thus created. Apart from the refining influences of art effected by the distribution of fine engravings after great pictures, the engraver plays no unimportant part in elevating the national character among nations. When, in 1746, John, afterwards Alderman Boydell, commenced his eminent career as an engraver and publisher, nearly all the better sort of engravings known in England were imported from France. The genius and enterprise of Boydell soon reversed this order of things, and made England famous throughout Europe for the number, variety, and beauty of the engravings issued from the establishment in Pall-mall, which the illustrious alderman founded, and where none but the ablest engravers were employed. Whether viewed in the light of a fine art, in which the taste of the nation at large is concerned, or from a purely commercial point of view, the art of engraving deserves all the protection and encouragement which can be accorded to it. The law of copyright should at once be rendered effective. It would be gratifying to know that photographic copies of great pictures were scattered broadcast over the land, so that they might be found in every home, providing the photographer paid for the privilege of thus catering for the good of the multitude generally, and for his own profit in particular. Simple arrangements might be suggested by which photographers might purchase from the owners of first-rate engravings the right to republish works of importance in a cheap form. In a general way those who could afford a fine impression in mezzotinto, by Samuel Cousins, would care little to look at copies in photography, which class of goods might be left to people of limited means. Thus, while the wealthy connoisseur took pride in his copper and steel plate, artist's proofs before letters, on India paper, and dilated on the various charms of light and shade, touch and colour, the middling-off and even the poor man might be permitted honestly to enjoy, with less critical eye, the diminished, blurred, cheap, sun-printed imitation.

[We copy from the *Standard*, the above remarks, the latter portion of which have much truth; but the whole spirit of the earlier remarks is narrow and one-sided, and wanting in truth and justice. We maintain, and always have maintained, the justice of the principle of copyright: but the print publisher has a prompt remedy in the existing law in all cases where he has not, for a consideration which he considers remunerative, put himself out of the pale of the law, by neglecting to comply with its conditions. Moreover, the print publishers, blind to their own interests, have refused to avail themselves of the facilities of photography for giving publicity and popularity to their works, and thus destroying the market for piracies, by filling it with legitimate and good photographic copies, which, so far from injuring the sale of their pictures, would probably have increased it, by acting as advertisements. We shall probably have more to say on this subject shortly.—Ed. Photographic News.]

Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting of this society was held on the evening of Wednesday, December 21st, at Myddelton Hall, Mr. G. Dawson, M.A., in the chair.

The minutes of a previous meeting having been read and confirmed,

The Chairman called attention to some charming examples of Messrs Helsby & Co's. photographs upon opal glass, which have been recently noticed in these pages. He remarked that Messrs. Helsby & Co. were not very communicative as to the process used, but he believed that the plate was coated with bromo-iodized collodion, excited, and exposed in the camera as in printing transparencies, and then developed and fixed in the ordinary way.

Mr. Wharton Simpson remarked that he thought the pictures must undergo some process of toning as well. The deposit of silver obtained by developing in the ordinary way, generally inclined to white by reflected light, rather than to the rich black presented by these specimens. In the original patent process on opal glass, by Glover and Bold, practised about eight years ago, printing by contact on collodio-albumen plates was practised, and the toning was affected by a gold solution.

Mr. Hislop said, that in some former experiments of his own he found, that by modifying the character of the developer, almost any colour could be obtained in the deposit: citric acid tending to a blue tone, and acetic acid to a brown tone.

The Chairman said, he thought that the tone was quite in the hands of the operator, almost any tone could be given in development. He thought however, it was very probable that these before the meeting were toned with gold.

Mr. Simpson said, that the colour of the deposit by transmitted light was to some extent in the hands of the operator, to be modified by development; but the colour by reflected light was more difficult to deal with. Some seven or eight years ago

he made some experiments in camera printing on opal glass, and he found it impossible by any modification of the developer to get a rich black by reflected light without some toning process. He found that a solution of bichloride of mercury followed by a dilute solution of ammonia, or hyposulphite of soda, gave a good black.

The Chairman then showed some exceedingly fine prints on opal glass, by Mr. Keith, of Liverpool. He had no details of the mode of production, but he thought they were clearly developed prints.

After some further conversation, the subject dropped.

Mr. W. W. King then read a paper on "Neglected Art-Fields for Photographers," (p. 625), during the course of which he exhibited some charming reproductions from paintings by Mr. Bingham, lent by Messrs. Marion and Co., for the occasion. In exhibibiting these he took occasion to remark, that it would be in his estimation a great convenience if a series of standard sizes for mounts were adopted, instead of any size which the fancy of the photographer or mounter might dictate. He also called attention to a series of copies of paintings, consisting of American scenery, photographed by Notman, of Canada, which Mr. Simpson had kindly brought to illustrate the subject.

Mr. Bockett said, he thought probably one reason photographers had not given so much attention to this subject as might be desirable, was the fact that paintings were somewhat difficult to copy well. Some years ago, he had a copy of a painting to make, and expected it would be a very easy job. He found, however, that it was nothing of the kind. It was difficult to get a sufficiently strong and equal light on the picture. He had found a valuable aid in a sheet of white paper spread underneath, to reflect light upwards.

Mr. W. H. Warner had had some experience in copying paintings, and especially some of those of the old school—very yellow. He found that by careful lighting, the use of a highly bromized collodion, Dallmeyer's triple lens, and long exposure, sometimes as much as ten minutes, it was possible to get good results.

Mr. Hislop some years ago had experimented in copying, chiefly for the magic lantern. He adopted a plan which answered very well in getting rid of texture. He placed the picture to be copied flat on the table, and then suspended the camera over it. He found that the picture thus illuminated, gave a copy quite without grain.

Mr. Simpson said, if he remembered rightly, their Secretary some years ago constructed a vertical camera for a similar purpose, which he exhibited and described at one of the meetings.

The Secretary (Mr. Barnett) said that his camera was made at the suggestion of Mr. Hislop.

The Chairman said the great point in copying seemed to be the securing of perpendicular rays.

Mr. Bockett said, that even in copying Daguerreotypes this was important, as unless the proper care in lighting were taken, the copying would show all the buff-marks.

Mr. Challis said, the late Mr. Clifford, in copying, placed his picture at an angle, and there suspended a piece of calico over it. His reason was the excessive amount of light in Spain.

Mr. Bockett said he found that the more light which could be obtained the better.

Mr. Simpson said he might make one suggestion which he had found useful in copying old paintings, in which much of the detail in the shadows was lost. Sponging the surface with a damp sponge had the effect, so long as the surface remained moist, of making the detail "bear out" better, and enabling a much better copy to be made. Of course thus rendering the surface brighter, rendered necessarily still greater care in lighting, to avoid false reflections.

Mr. Warner, having been examining the specimens on opal glass, thought he could offer a suggestion as to the method employed in producing them, the idea being deduced from his own practice in enlarging, in which, in order to get density when imperfect negatives were sent, he frequently made a copy on opal glass. They were printed in the camera like ordinary transparencies, a good exposure being given, developed with a weak iron developer, and fixed with cyanide. They were then treated with a solution of iodine and iodide of potassium, washed, and again treated with cyanide, and then washed for a moment with weak chloride of gold. He thought that such a method would give similar results. Any one could make the experiment for sixpence.

Mr. Seeley, recurring again to Mr. King's paper, said he thought that there would be some difficulty in getting permission to photograph at the British Museum.

Mr. King thought there would be no difficulty, if proper application were made.

A Member stated that there was considerable difficulty he knew. In one case, where permission was obtained, not less than five officials superintended his operations.

Mr. Seeley asked if there were any difficulty at South Kensington.

Mr. King had not enquired; he thought the whole system there a piece of iniquity.

After some further conversation, the subject dropped.

Mr. W. H. Warner then read a paper, describing a camera-stand intended for out-door work, but which possessed many contrivances for securing rigidity, and for placing the camera in various positions of elevation and depression, which are absent in the common tripod. The description of this, and the discussion thereon, must be deferred, for want of space, until our next.

Mr. Hart exhibited and explained his "Silver Saveall," for recovering silver from all kinds of solutions, by the aid of electricity. In answer to a question, he remarked that the plan recommended by Messrs. Davanne and Girard was very slow and incomplete. After some conversation, Mr. Hart also showed his lamp for burning magnesium wire, and illustrated its simplicity and convenience by burning some of the wire. The lamp has undergone some improvement since it was first made, and has an inexpensive but useful reflector of cardboard. He also showed a little cardboard model of his method of working with the magnesium light, to screen the camera and illuminate the sitter as perfectly as possible, and also a print from a negative so taken.

After some conversation, the subject dropped.

The Chairman exhibited a couple of prints which had been taken, he was informed, by a Ross's new doublet lens of ten inches focus. He did not vouch for the fact, but thought, if it were so, the prints were very remarkable.

Mr. Collis said they were taken by Messrs. Hill and Saunders, with the largest stop.

The prints were eleven inches by nine inches, full; the subjects being interiors, the lines quite free from curvature.

The Chairman called attention to the arrangements for photography at the forthcoming Dublin International Exhibition, and said that members might obtain forms for making application for space from the Secretary, at the close of the present meeting.

A Member showed a convenient dropping bottle or tube, consisting of a piece of glass tube drawn to a point, so as to have a very small aperture, the other end having a piece of india-rubber tube, closed at the top, attached to it. On placing the fine end of the tube in any liquid, with the finger pressed on the india-rubber tube, and then removing the pressure, the glass tube became filled by pneumatic pressure. A touch of the finger could then regulate the delivery of drops.

In the course of some conversation on the subject, Mr. Simpson remarked, that Mr. Solomon sold a dropping bottle of the same kind; and a Member said he thought it was manufactured by Brown, of Farringdon Street.

The proceedings then terminated.

Talk in the Studio.

The Wothlytype.—At a recent meeting of the Bristol Naturalists' Society, Mr. John Beattie made a communication on the Wothlytype process. He said he had seen pictures in London which were vigorous, delicate, and soft, but the specifications of the process were very incomplete, and his relations with the company unsatisfactory, so that he had not been very successful in obtaining good prints. The uranium salt employed acted solely as a reducing agent, like gallic acid, and the picture was in the paper, and not on the surface, the collodion film acting as a glaze, so that he considered them quite as likely to fade, and from the same cause, as ordinary photographs.

The Sale of Methylated Spirits.—We insert the following as a caution to some of our readers who may vend methylated spirits. Mr. J. Sherratt, chemist and druggist, of Pendleton, was recently charged before the Salford magistrates with preparing and mixing, and selling methylated spirit without a licence. From some facts which came to the knowledge of

the Inland Revenue superviser, a watch was put on the defendant's house, and a man was stopped as he was coming out of it with a bottle of the spirit in his hand. The defendant contended that it was a cordial mixture, and contained, as well as the spirit, quinine and Bell's mixture. It was accordingly sent to London to be analysed, but no traces of the two last-named ingredients could be found. The magistrates imposed the lowest penalty possible, viz.: in one count £12 10s. and in the other £25—total £37 10s.

A CHANCE FOR PHOTOGRAPHERS.—A recent advertisement in a daily paper, offers an opening for gentlemen ambitious of office in a House of Correction. He "must" so the advertisement runs, "write a good hand, be capable of taking photographic portraits, keeping the rules of the prison, and be willing to act as a discipline officer when required. He must be a person of great intelligence and activity, and be well educated. His salary will be £60 per annum, besides uniform, quarters, coals, candles, and gas." Well educated gentlemen who unite to great activity and intelligence, the accomplishment of skill in photography, have a rare chance of lucrative employment here!

SHAKSPEARE'S PRAYER BOOK.—We have received from Mr. H. J. Whitlock, of Birmingham, prints of several pages of the Prayer Book of 1594, alleged to have been Shakspeare's, containing his name in several places. The difficult task of photographing soiled and discoloured paper has been well done, affording excellent illustration of the value of photography in producing facsimiles of this kind to assist verification.

REDUCING CHLORIDE OF SILVER.—A correspondent of the *Scientific American* objects to the plan of reducing chloride of silver in the crucible by the aid of heat, as recommended by Professor Seely, and practised by photographers generally, on the ground that chloride of silver is very volatile, and that when heat is employed, much of it may be lost. Mr. Seely replies:—"The chloride of silver which I have occasion to reduce comes into my hands contaminated with the compounds of silver, and dirt in various forms. It is known as photographers' waste. I know of no way of profitably extracting the metal from such material except by fire. I seldom have pure chloride of silver; but that also I reduce by heat; no method with which I am acquainted answers the purpose better for me. I am aware that at the mint and some other very large refineries, the silver is precipitated from the chloride in the cold by zinc, not so much, I suppose, on account of loss of silver in the furnace process, but from other combinations which it is not necessary to name. Chloride of silver is volatile to some extent, but when it is properly united with carbonate of soda, the metal will be reduced by heat before a temperature could be reached which would volatilize the chloride. The temperature required practically for the process must evidently be that of melted silver; the metal is first reduced atomically at a moderate heat, when the heat being raised the particles of silver are brought into one mass. I am aware that the loss of silver is often serious in attempts to reduce it from the chloride by heat, but I am of the opinion that in such cases it might be shown that the loss was due, not to volatility of the chloride, but to unskilful mixing of the flux, or mismanagement of the fire.—CHARLES A. SEELY.,

To Correspondents.

H. B., of K.—Much depends on a number of circumstances you do not state and on the construction placed by lawyers on Acts of Parliament. You had better obtain the sanction of the owner of the copyright.

NOODLE.—The position of a stop in a portrait lens depends much upon its construction and upon the objects to be gained. If it be to remove distortion, the position will be decided by the foci of the lenses; for instance if the front lens have a focus of 8 inches, and the back lens of 16 inches, the stop would be placed twice as far from the back lens as from the front lens. If the object be to flatten the field, the stop will be placed still closer to the front lens. 2. You will find the best information on the subject you wish to study in the pages of our back volumes. Our YEAR-BOOK for 1865 contains detailed information on the use of stops and on dry processes. The front lens of the portrait combination may be used for views.

AN AMATEUR AND SUBSCRIBER.—The combustion of zinc yields a very brilliant light, but it is not comparable with that of magnesium in actinism, and a higher temperature is also required for the zinc.

J. R.—It is very difficult to procure mica of good quality, free from flaws, and in large sheets. Mr. Squire, of King William Street, can give you the best information on the subject, as he receives very large quantities for use in manufactures, besides that selected for photographic purposes. We have occasionally seen large sheets in his warehouse.

IODINE.—The best plan is to print the enlargements, when they are intended for finishing in chalk, upon paper having a tooth; but if this have not been done, you may size the print with a solution of gelatine, and dust very fine powder of pumice or cuttle fish bone evenly over the surface, not so thick as to materially obscure the picture, but sufficient to form a tooth, which will take the chalk readily.

G. B.—You cannot in any degree obscure the transparency of your glass without obstructing light, and if you wish to obscure it all, a white substance is better than blue. A strong solution of epsom salts applied hot will, when dry, give a frosted effect, which will prevent your being overlooked, but it will be at the expense of a little loss of light.

OLD CURMUDGEON.—The bursting of lead water-pipes in frosty weather is caused by the expansion of water when it freezes. There is no way of preventing it except by protecting the pipes from the frost. This may be done by covering them carefully with bands of straw, &c. Gutta-percha having a slight amount of elasticity, is less liable to be hurst by the lateral strain caused by the expansion of water.

G. J. BURGHALL.—You will find full instructions for making a good bromo-iodized collodion in our YEAR-BOOK. We can only give a recipe here in very brief terms:—Equal parts of ether and alcohol one ounce, pyroxyline 5 grains, iodide of ammonium 2 grains, iodide of cadmium 2 grains, bromide of cadmium 1 grain. 2. We have never found any evil results from the use of pure methylated spirits. 3. A whole-plate Lerebour may under some circumstances be available for instantaneous work, but it is not exactly the lens we should select for such work. It is probable that for portraiture it will answer very well.

S. H. HUTCHINSON.—A few grains of carbonate of soda will of course be insufficient to precipitate the silver in 60 ounces of solution. A few ounces will be required. Keep adding the carbonate as long as any precipitate falls.

G. M.—The proportion of nitrate of silver to be added to the uranized collodion has not been authoritatively determined. We have used 2, 3, 4, and 6 grains to the ounce, and have obtained as good results with the 2 grains as with any. The collodion is to be saturated with the nitrato of uranium. The exact amount dissolved seems uncertain, probably from 30 to 40 grains. From 5 to 7 grains of soluble cotton will give good results.

B. F. N.—If you use a highly salted albumenized paper, you should use a strong bath; but very brilliant prints may be obtained with weak baths if a lightly salted paper be employed.

M. M.—A dipping bath containing the iron solution may be used for developing, but the plan of pouring on, gives, as a rule, better results. 2. No.

A MEMBER OF THE NORTH LONDON ASSOCIATION complains that Major Russell, in speaking of those who were not convinced by the arguments and illustrations respecting *nubation* he forwarded to a meeting of that society a month or two ago, calls them "opponents of truth," instead of opponents of his opinion. The phrase, and some others quoted by our correspondents, are perhaps not wisely chosen; but it often happens in controversy that offensive phrases are used thoughtlessly and even unconsciously. The same thing occurs in the leader in our contemporary, who, having unhesitatingly indulged in offensive inuendo and misstatements, complains in a tone of injured innocence of these misstatements being pointed out. It is quite possible that the writer in question may be unconscious of having been offensive or personal in the imputations made, and also that he may fancy we intended to be personal: a great mistake in either case. Our correspondent's remarks on the negatives exhibited are inadmissible, as they were not put forward as examples of good work. On the question of thick and thin films we can say nothing further. Mr. Hughes, having spent some hours with Major Russell, stated, that he used thin films. Major Russell says he does not. There the matter stands. We cannot satisfactorily answer your question as to why painting the back of the negative, and thus increasing its power of reflection, in fact, making it a mirror, should prevent fogging by reflection, unless it be that the light so reflected is, by the colour of the pigment, deprived of its actinic character. Major Russell's illustrations do, however, unquestionably prove the fact. We do not like the word *nubation* especially, but we want a clear and distinctive term, not likely to create misunderstanding. However, we are very sick of the subject, and do not intend voluntarily to refer to it again.

B. P.—The stains on your negative are caused by the nitrate of silver, which had drained into the dark slide, being splashed up by the closing of the sliding shutter. You should avoid allowing those drainings to accumulate. The density is about right for printing.

N. B.—Lines running down the negative and the image being indistinct, indicate a tendency to fog. This tendency generally arises from the condition of the nitrate bath, but if it continue as you state after making a new nitrate bath, the fault is probably in the collodion. Try adding a few drops of tincture of iodine, sufficient to make the colour of brown sherry. If that fail, try a fresh sample.

T. J. H., Andalucia.—The YEAR-BOOKS shall be duly forwarded. You will find in them all the novelties and modifications of the year. We will remember your request, but do not know of any other work at present.

A. E. G.—Your letter did not reach our hands until Saturday; too late for a reply in time. Mr. Aldis is the only gentleman whom we know in London at present making use of artificial light for enlarging purposes.

A CONSTANT SUBSCRIBER.—Thanks for the paragraph, which we will use.

J. S.—The print of an interior is very good. We cannot advise you efficiently about the proper charge for such a thing, as so much depends on circumstances. Perhaps a couple of guineas.

Several articles and letters are compelled to stand over.

Several correspondents in our next.

Photographs Registered during the Past Week.

MR. JAMES BOLTON, Hotwell House, Clifton, Bristol.
Lithograph (from Drawing, by Mr. Lavors) of Suspension Bridge, Clifton.

*** The Publisher respectfully requests that all remittances above 3s. may be made by Post-Office Orders, payable to THOMAS PIPER, at the Chief Office, St. Martin's-le-Grand. Sums below 3s. may be remitted in postage stamps.

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